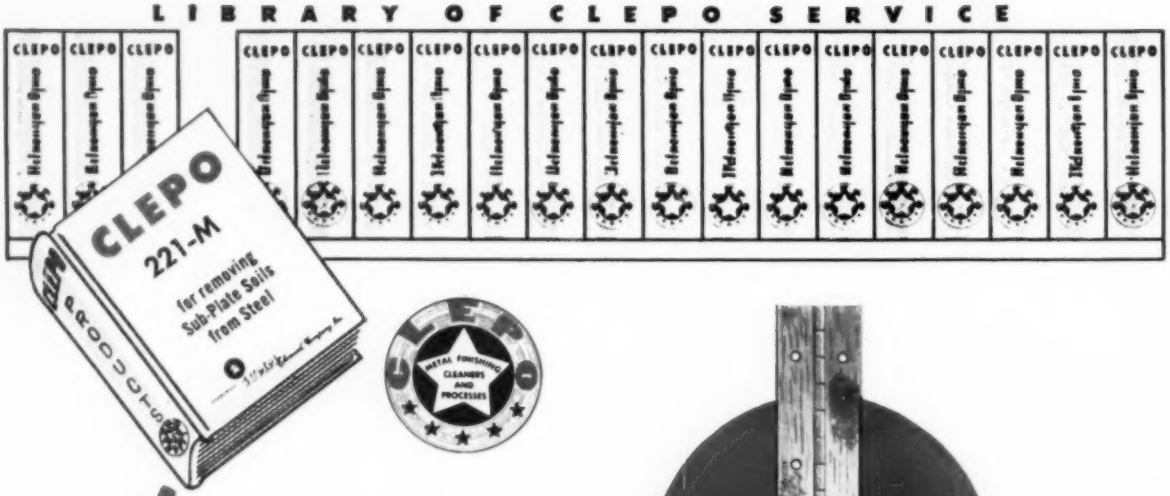
plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

JANUARY 1959

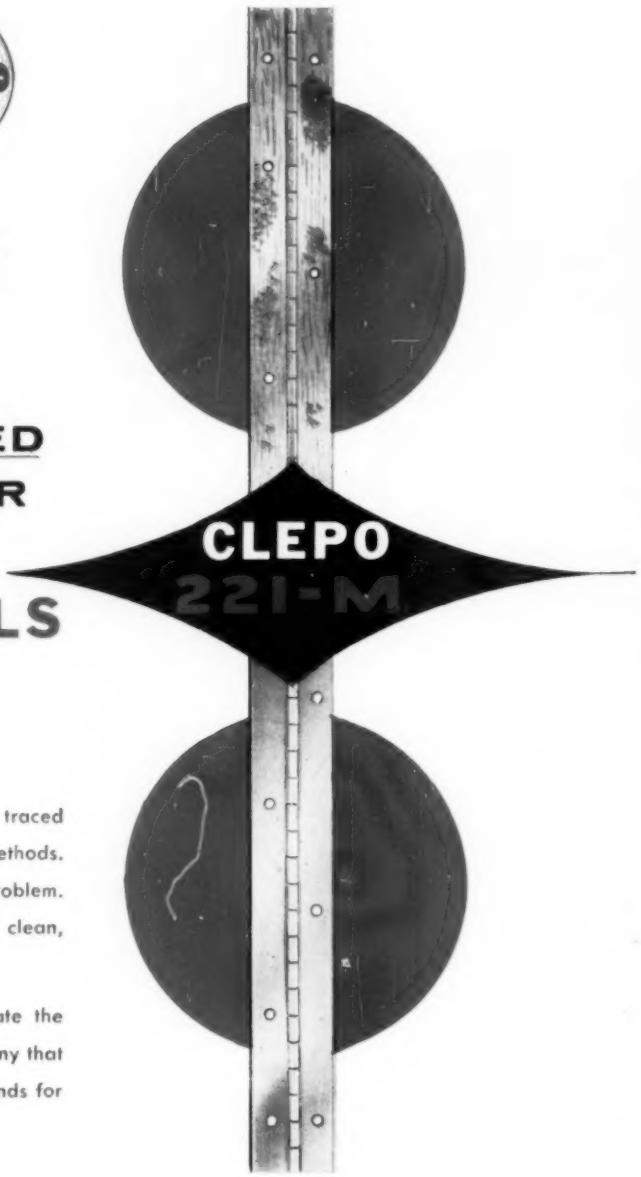
ABRASIVES AND MECHANICAL FINISHING

University Microfilms
313 N. First St.
Ann Arbor, Michigan



Announcing

A NEW AND PROVED ELECTRO-CLEANER FOR REMOVING SUB-PLATE SOILS FROM STEEL



Many of the steel-plating troubles of today can be traced back to sub-plate soils that defy the usual cleaning methods. CLEPO 221-M has been developed to answer this problem. By loosening surface smuts and films, it produces a clean, white steel base which helps to produce quality plate.

Ask to have a CLEPO Field Service Man demonstrate the effectiveness of CLEPO 221-M, the product of a company that has been developing and marketing cleaning compounds for more than twenty-five years.

FREDERICK
1-FG2

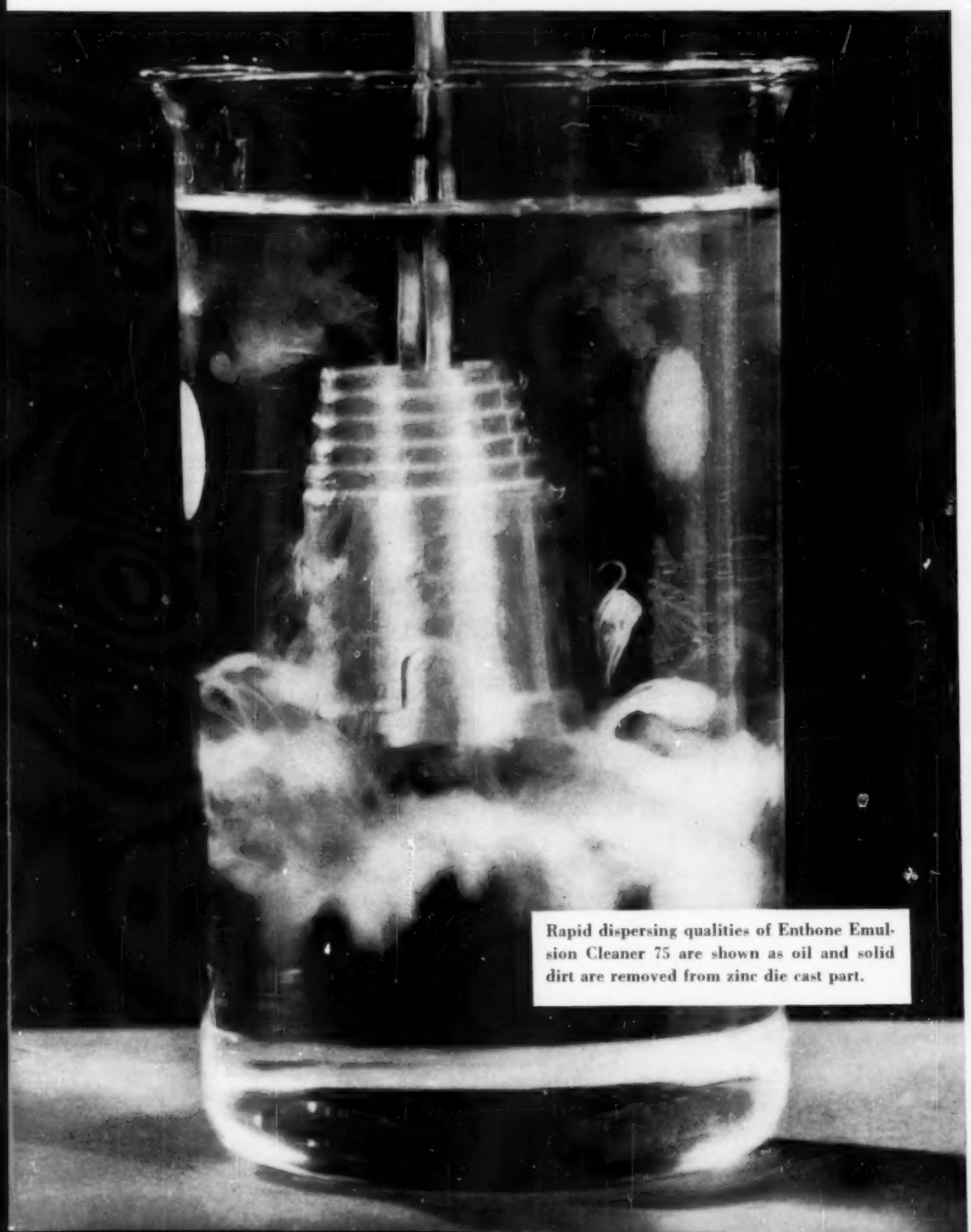
GUMM *Chemical Company Inc.*

538 FOREST STREET, KEARNY, N. J.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 100.

INDICATE A 101.

How to make metal cleaning an exact science: Enthone's broad range of cleaning and degreasing compounds are the end result of more than 20 years of applied research in the laboratory and in the field on metal finishing problems. These compounds include emulsifiable and solvent cleaners, alkaline cleaners for soak or electrolytic cleaning of iron, steel, copper, brass, zinc and zinc base die castings. And if there's no Enthone stock cleaner that meets your requirements, Enthone will develop a special one that does. Write us about it. Enthone, Inc., 442 Elm St., New Haven 11, Conn.



Rapid dispersing qualities of Enthone Emulsion Cleaner 75 are shown as oil and solid dirt are removed from zinc die cast part.

ENTHONE

ENTHONE, INC. IS A SUBSIDIARY OF AMERICAN SMELTING AND REFINING COMPANY

AT LAST A BOILER DESIGNED FOR THE PLATER!

Model 105 Sellers Closed Combustion Chamber Boiler

NOW—No more foul fumes because of incomplete combustion due to back draft through boiler created by exhaust fans or poor draft conditions.

SELLERS solves this problem with the improved design, closed combustion chamber boiler. All air for combustion, both primary and secondary, is pushed through the boiler under positive pressure, independent of partial vacuum in the building and independent of any back draft on the chimney (of course, products of combustion must be removed from building).

A positive pressure blower supplies air under pressure which is mixed with the gas and passed to burners in the completely closed combustion chamber; to complete combustion, secondary air is fed into the closed chamber under positive pressure (many times greater than the vacuum in the building). By this method of securing positive complete combustion, burned gases are pushed through the boiler and FOUL FUMES ARE ELIMINATED.

Read about these Extra Features in Catalog 5206

1. NOW—SCHOOL ROOM QUIET
2. ALL-ON, ALL-OFF RUNNER PILOTS
3. NO OPEN FLAME
4. WORKS ON LOW GAS PRESSURE
5. POSITIVE PRESSURE BLOWER OVERCOMES BUILDING VACUUM AND CHIMNEY BACK DRAFT
6. SIZES FROM 15 HP TO 200 HP

Sellers ENGINEERING CO.

4876 N. CLARK STREET CHICAGO, ILL.

Blast Heaters • Immersion Automatic Water Heaters • Combustion Units • Industrial Gas Burners
Vertical Steam Boilers • Immersion Tank Heaters • Gas Combustion Equipment

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JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

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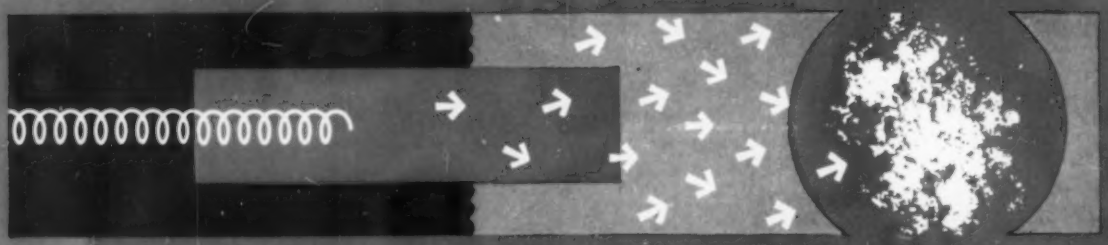
HARSHAW PRESENTS **2** *new, outstanding* BRIGHT COPPER PLATING PROCESSES

HARSHAW CYNOREX Copper Plating Process

(High Speed Copper Cyanide)

The Harshaw CYNOREX copper process is a new high speed copper cyanide bath which produces a bright and ductile copper by the use of a single addition agent designated as CYNOREX No. 1. It has many advantages including unusual brightness; a smooth fine grain and ductile deposit; stability; high efficiency; economical operation; and high tolerance to metallic impurities. The process can also be operated with air agitation.

The CYNOREX process is easy to maintain and operate because it has only one brightening addition agent. It is a non-metallic addition agent which is very stable and is not removed by carbon circulation. Since the brightener is not removed by carbon and the cathode and anode current efficiencies of the bath are 100%, operational costs are kept to a minimum. Because of the stability of the single brightening addition agent, the CYNOREX bath will produce satisfactory bright deposits even after extremely long periods of shutdown. A compatible wetting agent is available where operating conditions dictate its use.



HARSHAW CUPREX Copper Plating Process

(Acid Copper)

Among the advantages of the new CUPREX acid copper process are its superior brightness, excellent leveling, ductility, and stability. Also, the bath can be operated not only as a still or cathode rod agitated solution but also with air agitation. Another distinctive advantage of this process when operated still or with cathode rod agitation is that a cyanide copper strike is not required for adhesion of the copper to the base metal. As an air agitated solution the normal copper or nickel strike is required. The bath has indefinite operational life and therefore, the problem of treatment cleanups is at a minimum. In this respect CUPREX is superior to other bright acid copper plating processes.

The bright throwing power of the CUPREX copper bath is superior to any competitive acid copper plating solution. The deposit is the most easy to buff of any acid copper plate because of its great leveling and hiding power. Nodular build up in all instances is characteristically at a minimum.

The CUPREX process yields a deposit having a high ductility thru the entire range of conditions and compositions used to vary the deposit from an excellent semi-bright to the fully bright appearance so easily obtained.

Each of these new outstanding Harshaw Bright Copper Plating Processes has certain unusual characteristics which fit into the product finishing requirements in your plant.

Contact the Harshaw Branch nearest you. Harshaw representatives will be happy to discuss with you the application of these processes in your plant.

The Harshaw Chemical Co.

1945 East 97th Street • Cleveland 6, Ohio

CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HOUSTON • LOS ANGELES

HASTINGS-ON-HUDSON, N. Y. • PHILADELPHIA • PITTSBURGH

EDITORIAL

"THE FIFTIETH YEAR"

WE OF AES HAVE TRAVELED fifty years from our beginning. When a traveler gets to a vantage point in his journey, he pauses to look back to see in panorama where he has been. In our view, we can see great progress has been made by AES in many directions. Mainly, this progress has been pointed toward a better world with industry, private institutions and the government the major beneficiaries through the work of thousands of AES members.

AES can be justly proud of the Research Program, liaison work with other Societies and various committees, the technical value of PLATING magazine, and the many educational sessions at Branch, Regional and National meetings. However, the greatest single value of AES has been, and will continue to be, the interchange between individual members. Those seeking to learn meet with those willing and able to teach. This one factor has done more to take electroplating out of the mysterious, alchemy stage and transform it into a modern, progressive science.

Each one of the older AES members could recount many startling developments which they have seen transpire; and yet we are only in the beginning. In the future, to be sure, great new discoveries will be made and AES must do its share—and more.

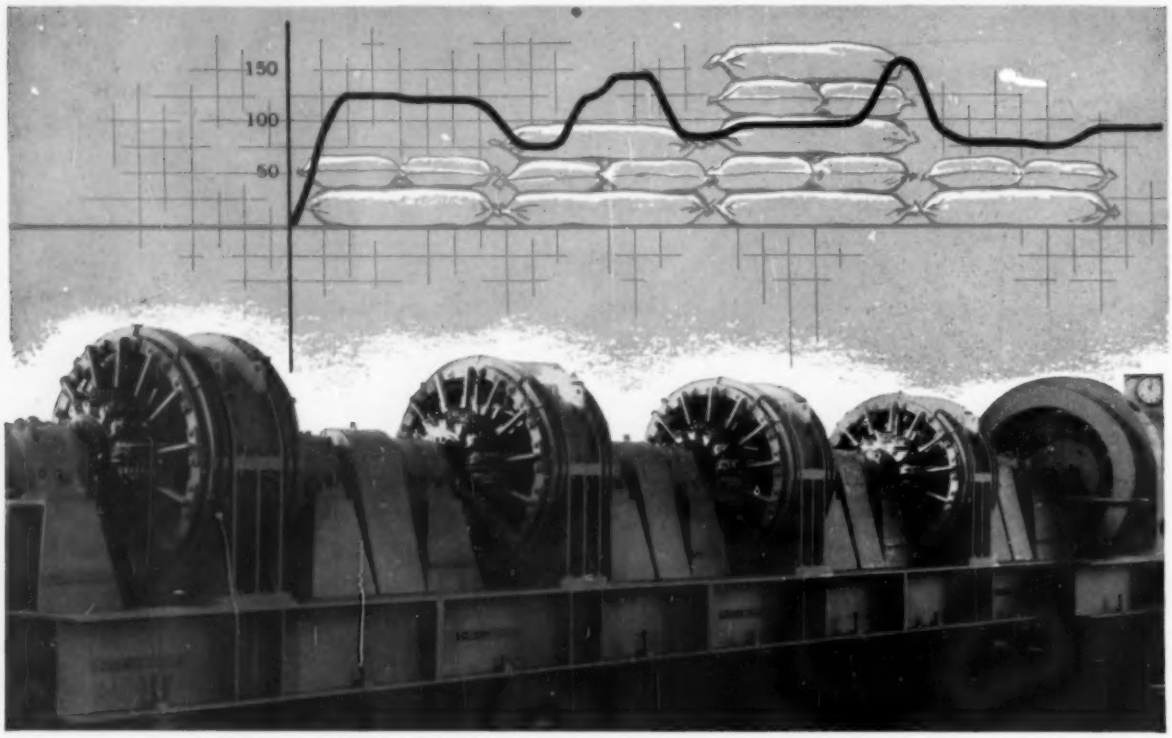
In viewing the past as it spreads out behind us, we are also compelled to turn and look ahead. Many paths with many obstacles stretch into the unknown. 1959 is truly a year for remembering the achievements of the past but more truly, it is a challenge for the future. AES must accept and meet that challenge.

Francis J. Eddy

Past President

◀ INDICATE A 103.

EXTRA stamina...WHEN YOU NEED IT MOST



...PROOF THAT MOTOR GENERATORS ARE YOUR MOST DURABLE FORM OF POWER CONVERSION

Chandeysson **generators are built with high overload capacity—up to 50% momentarily**

Stamina and durability are built right into Chandeysson Motor Generators to give you more power when you need it most . . . in an emergency. You get overload capacity as great as 50% momentarily and 25% for 2-hour periods . . . without distress or damage. All *this* is the result of Chandeysson's sound engineering, painstaking design, specialized craftsmanship, and thorough testing.

Stamina is just one of many reasons why the plating industry *insists* on Chandeysson low-voltage generators for direct current power needs . . . for extra capacity to meet emergencies at the lowest possible cost.

For full information, write now for new booklet D-103.

CHANDEYSSON ELECTRIC COMPANY

4078 Bingham Avenue • St. Louis 16, Missouri

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 104.

◀ INDICATE A 103.

GOLDEN JUBILEE ISSUE ADVERTISING RESERVATION

THE Fiftieth Anniversary observance of the American Electroplaters' Society, Inc. (AES) will be climaxed not only by the AES's Golden Jubilee Convention and Industrial Finishing Exposition, including the Fifth International Conference on Electrodeposition and Metal Finishing, to be held in Detroit, June 15-19, 1959 but also by the GOLDEN JUBILEE ISSUE of AES's PLATING MAGAZINE (June 1959).

A FEATURE edition beamed to command global readership appeal by the character of its special technical and scientific articles, it will also have rare remembrance strength and long retainment as an AES reference source and memento of AES's GOLDEN ANNIVERSARY by the character of its institutional and historical contents, including the "Kaleidoscope of AES's First Half-Century."

BECAUSE of the GOLDEN JUBILEE ISSUE's planned sizable editorial stature, PLATING's blueprint of that issue, at this stage, allows for only 150 pages of company product and institutional advertising, much of which has already been spoken for by PLATING MAGAZINE's regular contract advertisers. There is no price increase for advertising in that issue. PLATING's current space rates (Rate Card No. 9), lowest among magazines in this field for largest paid circulation apply to wit on a one-time basis:

1 page	$270	1/2 page	$155
2/3 page	250	1/3 page	150
1/2 page (Is)	220	1/4 page	80
1/8 page	$60		

Extra charge for color and/or bleed.

Available special positions are charged extra.

ALL text and plates for advertising accepted and contracted to appear in the GOLDEN JUBILEE ISSUE must be in the hands of PLATING's Production Manager on or before April 15, 1959.

IF YOU are among the many companies interested in reaching the vast purchasing power of the electroplating and metal finishing industry through product or institutional advertisement(s) in this unique feature edition, you are earnestly invited and urged to fill out the below advertising reservation ticket, and mail it NOW to Golden Jubilee Issue Section, PLATING MAGAZINE, 443-445 Broad Street, Newark 2, N. J.

GOLDEN JUBILEE ISSUE ADVERTISING RESERVATION

Golden Jubilee Issue Section
PLATING MAGAZINE
443-445 Broad Street
Newark 2, N. J.

.... (Date)

Reserve for .... (Specify Company)

a total of .... (Specify amount of space) in the GOLDEN JUBILEE ISSUE and communicate by phone or letter with the undersigned so as to finalize insertion details.

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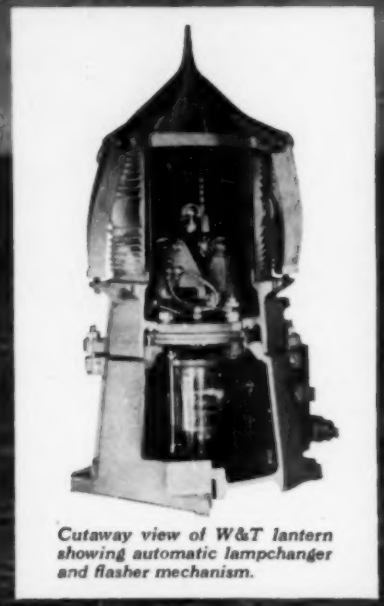
J-1

ANOTHER PLATING PROBLEM SOLVED BY SEL-REX!



Cutaway view of W&T lantern showing automatic lampchanger and flasher mechanism.

WALLACE & TIERNAN SAVES 932 HOURS ON FIRST TWO JOBS WITH JET PLATER

Always alert to modern production methods, Wallace & Tiernan, Inc., Belleville, New Jersey, have realized almost incredible savings in production-time with their SEL-REX JET PLATER—the complete plating "plant" in a single compact package.

"Electroplating of flasher and lampchanger components used in Wallace & Tiernan's Aids To Navigation has always been an important part of our production," says Mr. C. W. Davis, Manager, Mechanical Manufacturing. "That's why we're so pleased with the substantial savings in production-time since we installed our JET PLATER. In addition, together with the Sel-Rex Bright Gold Process, we are now getting a Gold Plate superior to any we had ever produced before."

Whatever your plating problem — precious metals, power, equipment or procedures — Sel-Rex Representatives are trained to "Custom-Engineer" solutions to our mutual profit. Send for FREE technical data and other case histories, and see for yourself ... we may have solved *your* problem last month.

Jet Plater

Complete electroplating "plant" in 34" x 28" x 33" cabinet.

Sel-Rex®

SEL-REX CORPORATION

NUTLEY 10, NEW JERSEY

Manufacturers of Exclusive Precious Metals Processes, Metallic Power Rectifiers, Airborne Power Equipment, Liquid Clarification Filters, Metal Finishing Equipment and Supplies

Wheels coated with ALUNDUM abrasive give housing covers a high polish faster and for less money. Setting up the wheels, as shown, is an easy job. The high capillarity of this polishing grain improves and speeds up the wetting process with glue or cement.

Pay less for polishing...set your wheels up to save!

ALUNDUM abrasive brings you the value-adding, cost-cutting "Touch of Gold"*

Norton abrasives are first choice in many plants for better results at lower costs, in the widest range of polishing jobs.

Where especially long life is desired, the blocky shaped E_1 ALUNDUM B abrasive is extremely popular. Available in grit sizes 14 to 240. Where faster cutting action is required E_{138} ALUNDUM S abrasive (sizes 14 to 90) or E_{138} ALUNDUM R abrasive (sizes 100 to 240) are first choice. All three types are specially treated to give much greater adhesion with glue or cement. Typical advantages common to all ALUNDUM polishing grains include:

- *Uniform grain shapes*, which assure fast, uniform cutting action.
- *Uniform grain sizings*, with no oversize grains that mar the finish, no undersize grains to loaf on the job.
- *High capillarity*, assuring the easy absorption of adhesive that means longer lasting, better performing set-up wheels.

The booklet "Setting Up Metal Polishing Wheels and Belts" contains valuable facts on the various types of ALUNDUM abrasive . . . on the applications of canvas, leather or wooden wheels . . . and on the best means of preparing wheels, with cement or glue. Ask your Norton Distributor for it. Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

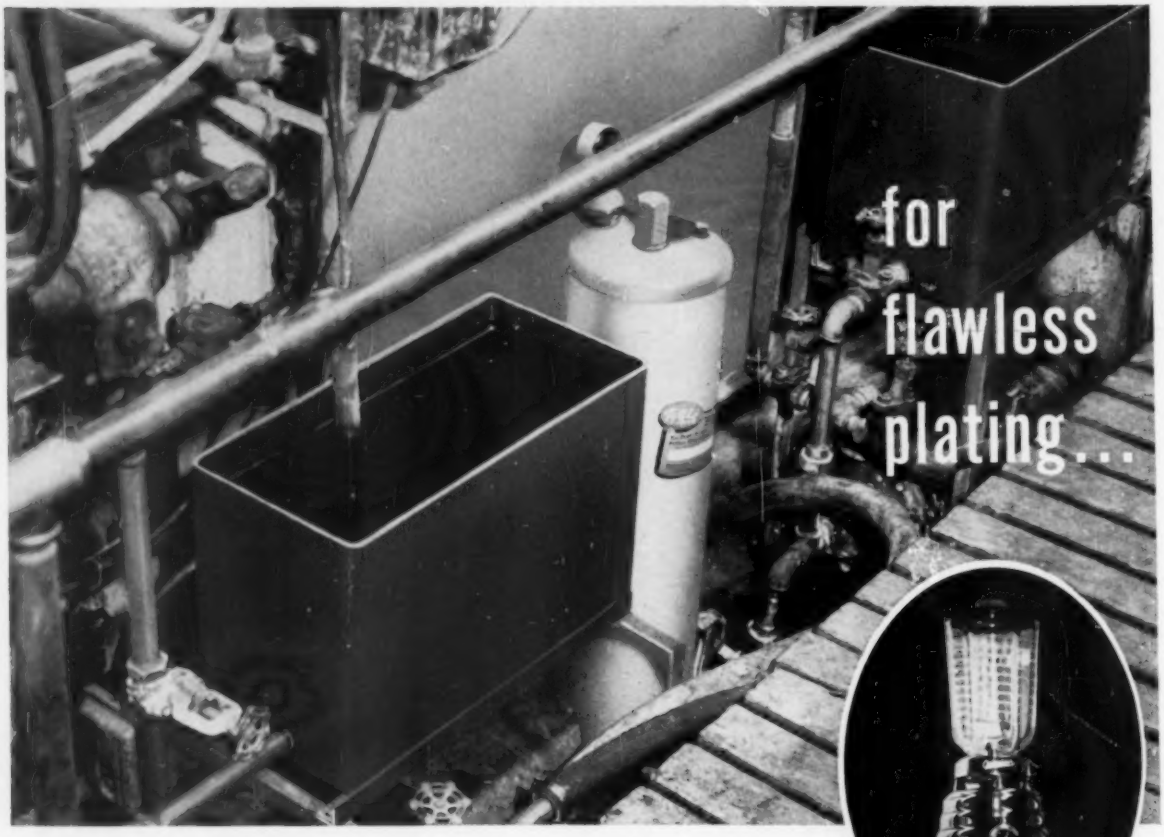
*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

G-354

Making better products . . . to make your products better

NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — **BEAR-MANNING DIVISION** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



OSTERIZERS rely on *Fulflo Filters*

The plating quality of Osterizers, made by John W. Oster Manufacturing Company, Milwaukee, Wisconsin, is universally acknowledged. One way they insure flawless plating is to use Fulflo Filters on every tank to provide continuous micro-clarity of the solution.

Fulflo Filters offer a brand new concept of plating filtration — complete tank turnover up to three times per hour! This means complete solution filtration four times in an eight-hour day. Impurities are removed as fast as they're formed. Agitation is automatically increased.

You have a choice of rubber-lined or stainless steel containers for high *p*H solutions; plain steel for cyanide. Models, employing from 1 to 142 Honeycomb Filter Tubes, are compact and economical.

For booklet on "A New Concept of Plating Filtration", write to Department PL.

COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

Fulflo FILTERS — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC FILTERS — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*

When you see the Mutual trademark on the chromium chemicals you buy, you can be assured that you will get uniform quality and prompt delivery.

It means the product in the package has, in back of it, the knowledge and skill that America's first producer of chromium chemicals has acquired during the more than 100 years continuous production.

It means you can expect rapid delivery from strategically located warehouses—and you can choose from a variety of types and sizes of packages.

Send for this bulletin. It contains information on the full line of Mutual Chromium Chemicals.

Mutual chromium chemicals

Sodium Bichromate
Sodium Chromate
Chromic Acid
Potassium Bichromate
Potassium Chromate
Ammonium Bichromate
Koreon (one-bath chrome tan)

SOLVAY PROCESS DIVISION
61 Broadway, New York 6, N.Y.

Allied Chemical

MUTUAL chromium chemicals are available through dealers and SOLVAY branch offices located in major centers from coast to coast.

Solvay Process Division
Allied Chemical Corporation
61 Broadway, New York 6, N. Y. **Dept. 8-19**

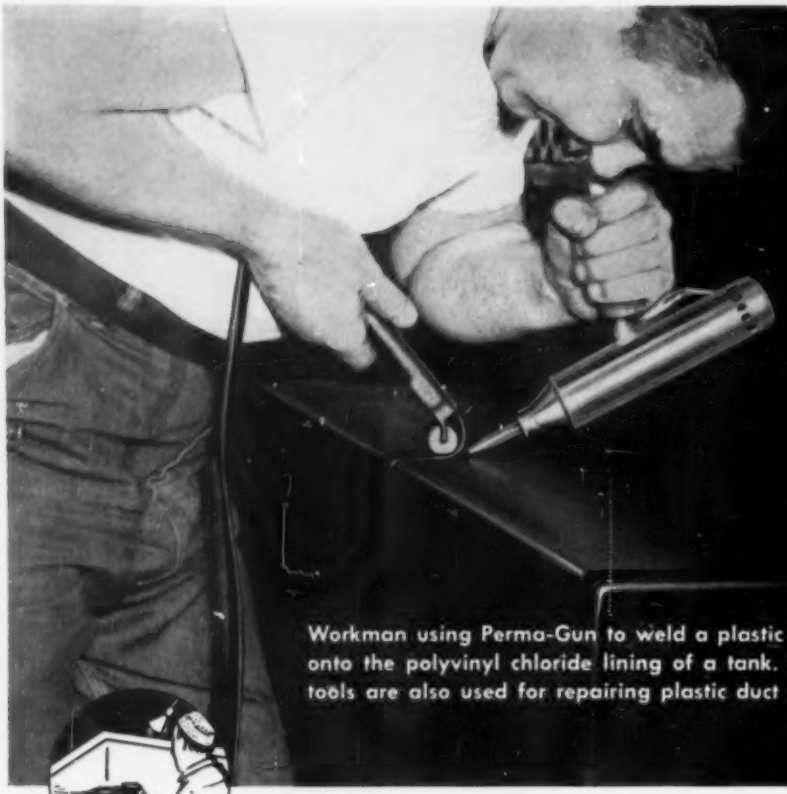
Please send me Bulletin #52—"Chromium Chemicals."

NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____



Workman using Perma-Gun to weld a plastic seam onto the polyvinyl chloride lining of a tank. These tools are also used for repairing plastic duct work.

REPAIR YOUR OWN TANKS

Here are professional tools for repairing damaged polyvinyl chloride lined tanks in your own plant at low cost.

TESTING
The smallest leaks can be detected easily.

PATCHING
If damaged area is large, cut out and cement a patch in place.

SEAMING
Use Perma-Gun to weld seam and make it a homogeneous part of the lining. Seam material is furnished.

A single tank repair job can pay for the set of Perma-Line Tank Repair Tools shown below. These are professional tools developed by us over a period of 18 years, designed to give years of rugged service, and used by our own men to detect leaks and repair damaged plastic linings as good as new.

These tools are now in use by people who say the spark tester alone is worth the price because of its value in preventive maintenance.

Order your Perma-Line Tank Repair Tools now. Complete instructions for use are included. Send check or money order.

Here are the complete Perma-Line Tank Repair tools for repairing any polyvinyl chloride lining.
All for $159.00 post paid.

Perma-Line High Frequency Spark Tester
Dual Seamer—for Flat Surfaces and Corners
Heat-resistant Stainless Steel Perma-Gun
Sheet of plastic patching material
1 Can of Solvent and 2 Cans of Cement
Stitcher
Roll of plastic seaming material
Utility knife

Perma-Line PRODUCTS

PERMA-LINE RUBBER PRODUCTS CORPORATION
1753 N. Winnebago Ave., Chicago 48, Illinois • Humboldt 9-2020

M&T BRIGHT CYANIDE COPPER

HAS EVERYTHING!

BRIGHTNESS Mirror bright deposits, if you want, or less bright as required by your installation or work . . . obtained consistently.

SPEED With wide bright range plus high cathode efficiency, M&T Copper permits you to use high current densities for fast smooth plating without burning on edges.

STABILITY Addition agents used prove unusually stable. Now you can have greater freedom from troublesome decomposition products. Addition of M&T NEOCHEL*, in particular, not only improves plating performance but also makes anodes corrode evenly.

ECONOMY Bath upkeep cost is surprisingly low because of long life and stability of the addition agents.

SIMPLICITY You control the bath additives with only one chemical analysis and a single Hull Cell test.

The latest in Metal & Thermit's line of copper plating processes, M&T Bright Cyanide Copper offers you everything for plating production prior to chromium. Call in an M&T plating engineer to fill you in on the full details. Or send for Data Sheet.

*Pat. applied for.

METAL & THERMIT
CORPORATION
GENERAL OFFICES: RAHWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • E. Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium of Canada, Limited, Rexdale, Ont.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 110.

Take a buyer's critical look at your zinc plating. Does it have the sparkle and brilliance that reflect its real quality? A high-grade finish may well provide the competitive edge which keeps your customers satisfied.

Leading manufacturers of everything from TV antennas to nuts and bolts have found these ROHCO® Zinc Brighteners provide the superior finish they are looking for:

ROHCO 503 STILL AND AUTOMATIC ZINC BRIGHTENER
ROHCO 100 BARREL ZINC BRIGHTENER
ROHCO 175 BARREL ZINC BRIGHTENER

The cost? Insignificant! Studies have shown that the difference between an ordinary finish and a full-bright ROHCO finish amounts to *less than ½% of plating costs!*

Your customers will appreciate seeing how ROHCO full-bright zinc can help sell their products. Show them. A nearby ROHCO Technical Representative will be pleased to help you improve your zinc plating, without obligation. Write us.

ROHCO

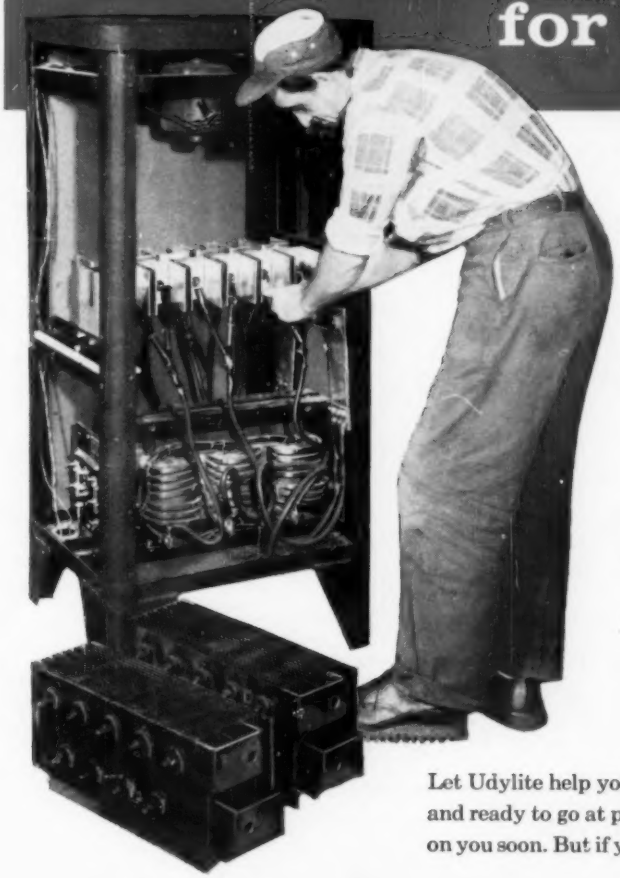
Nationwide Stockpoints

R. O. HULL & COMPANY, INC.
1302 Parsons Court Rocky River 16, Ohio

Project Alert Working at UDYLITE *Produces for You...*

SILICON EFFICIENCY, RUGGEDNESS AND LONG LIFE

for old rectifiers



1. **A SPECIAL PRODUCT . . .** For the first time, a Udylite-engineered, Udylite-built *silicon* replacement stack is offered for you to use in revitalizing your Udylite magnesium-copper-sulphide or selenium rectifier and upgrading its performance to the level of today's best. *And you can do this in your own shop,* without delay, at a minimum of expense and down time.
2. **A SPECIAL SERVICE . . .** As an alternate plan, your old rectifier can be returned to Udylite for *factory* installation of the silicon replacement stacks by trained rectifier specialists. At the same time, your rectifier will be completely overhauled and tested so that it will be returned to you renewed and ready for the longer life and high efficiency of Udylite silicon.
3. **A SPECIAL VALUE . . .** This whole program is set up as a Project Alert. A special department will handle your order and your equipment from start to a completely satisfactory finish. A *guaranteed delivery* will keep your down time to a minimum. With prices based on a production line plan, you will get more value per dollar spent than you ever before thought possible.

Let Udylite help you get your entire plating operation in top working order and ready to go at peak capacity. Your Udylite sales engineer will be calling on you soon. But if you need priority service, write, phone or wire directly to:

the udylite corporation

detroit 11, michigan • world's largest plating supplier

PROJECT ALERT

RELIANCE BARRELS

FOR BALL BURNISHING OR ABRASIVE TUMBLING

will give you better finishes faster

Type L

Rigid box-type construction
Heavy roller bearings
Quick-change door with safety valves
Gearhead motor and gear drive—no belts

Cylinder can be operated in horizontal and/or angle position which produces a double tumbling action, resulting in a better finish in shorter time.

Furnished with cylinder unlined, wood lined, or rubber lined. Available in two sizes.

TYPE A—TILTING TYPE

Easy to Load and Unload . . .
Round or Hexagon (oblique) Shaped Tubs . . .
With or without Vulcanized Rubber Lining . . .
Gearhead Motor . . .
Low Maintenance Cost

HANDLES WIDE VARIETY OF SHAPES AND LOADS

Type A

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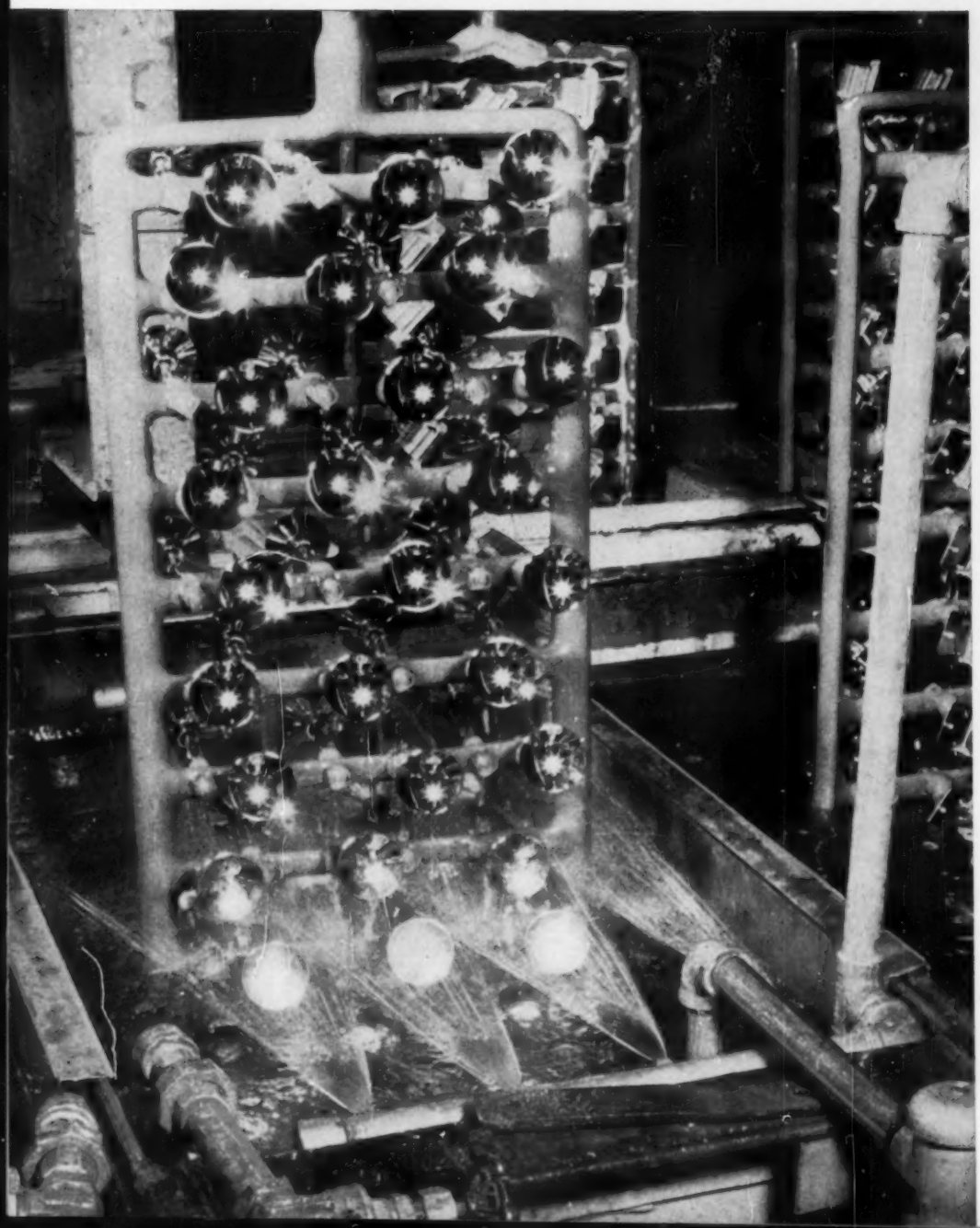

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"The electrolytic oxidation of hydrogen found on freshly electroplated black nickel deposits showed the presence of three forms of hydrogen. These forms of hydrogen are oxidized in the ranges (1) −0.82 to −0.64, (2) −0.30 to −0.26 v, (3) −0.04 to ±0.02 v.

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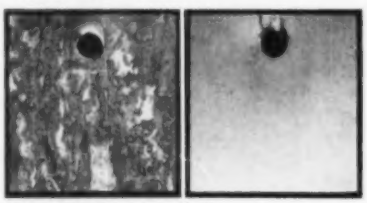
There are no hazards involved—Irilac is non-fuming, non-toxic, and requires no special fire prevention measures.

THE PROCESS

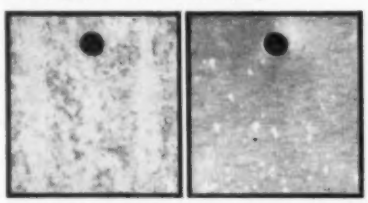
Irilac #1000 is diluted with water to provide a simple one-pass working solution. It is then applied by dip, brush or spray and forms a coating that quickly *bonds* to the metal surface without reacting with the surface.

THE PROPERTIES

The resulting coating is clear, transparent, thin yet durable. It has excellent water-resistant properties, and can be rubbed, handled and subjected to rough treatment. The surface to which Irilac has been applied is not altered—in fact, the transparent coating brings full tone to colored surfaces and clarity to iridescent surfaces. The water-thin physical characteristic of the solution means that the coating provides protection in recessed areas that are difficult, if not impossible, to protect with other methods.



STEEL PANELS: bare (left) and coated with Irilac (right) after 8-hour salt spray.



ALUMINUM PANELS: bare (left) and coated with Irilac (right) after 168-hour salt spray.

WHERE IRILAC CAN BE USED

Irilac #1000 can be applied to *any* metal—wet or dry—treated or untreated. All metals can be processed in *one* operation in the same solution. It can be applied in conjunction with any process—over Iridite, anodized, phosphated surfaces, black oxide, etc. Surfaces treated with Irilac provide a good base for paint.

APPLICATION ADVANTAGES

No other process or material available for the protection of metals offers all the application advantages found in new Irilac #1000:

1. It can be applied to *any* clean metal simply by dip, brush or spray. No special equipment is required.
2. Saves time—just apply and dry—no reaction time required.
3. No hazards involved—no exhaust or special fire protection equipment is required. Irilac is non-fuming and non-toxic.
4. Saves space. Presents no disposal problem. Low in first and final costs.

Because of its versatility and complete safety, Irilac has unlimited uses. For example, it will protect aluminum furniture, brass hardware and fixtures, steel parts of all types, zinc castings, etc. In fact, any base metal or plated surface, or those treated with electrolytic or chemical post-treatments, can be improved or enhanced with Irilac.

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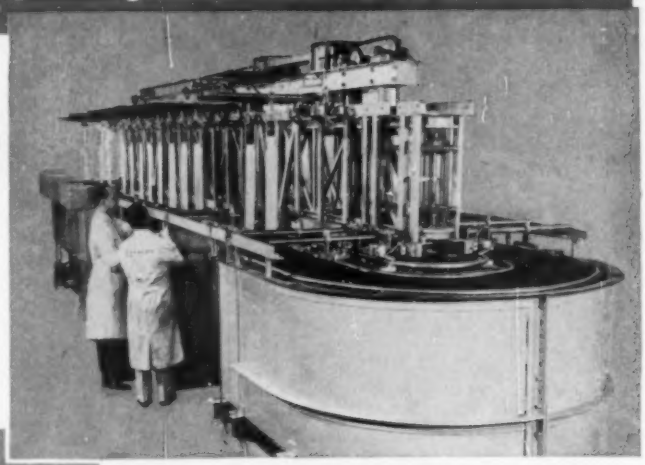

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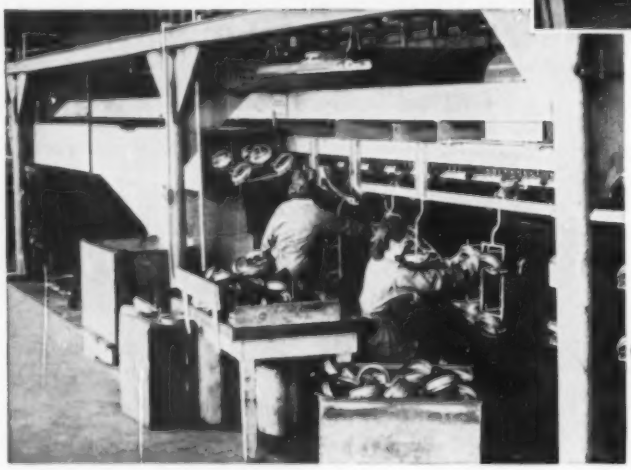

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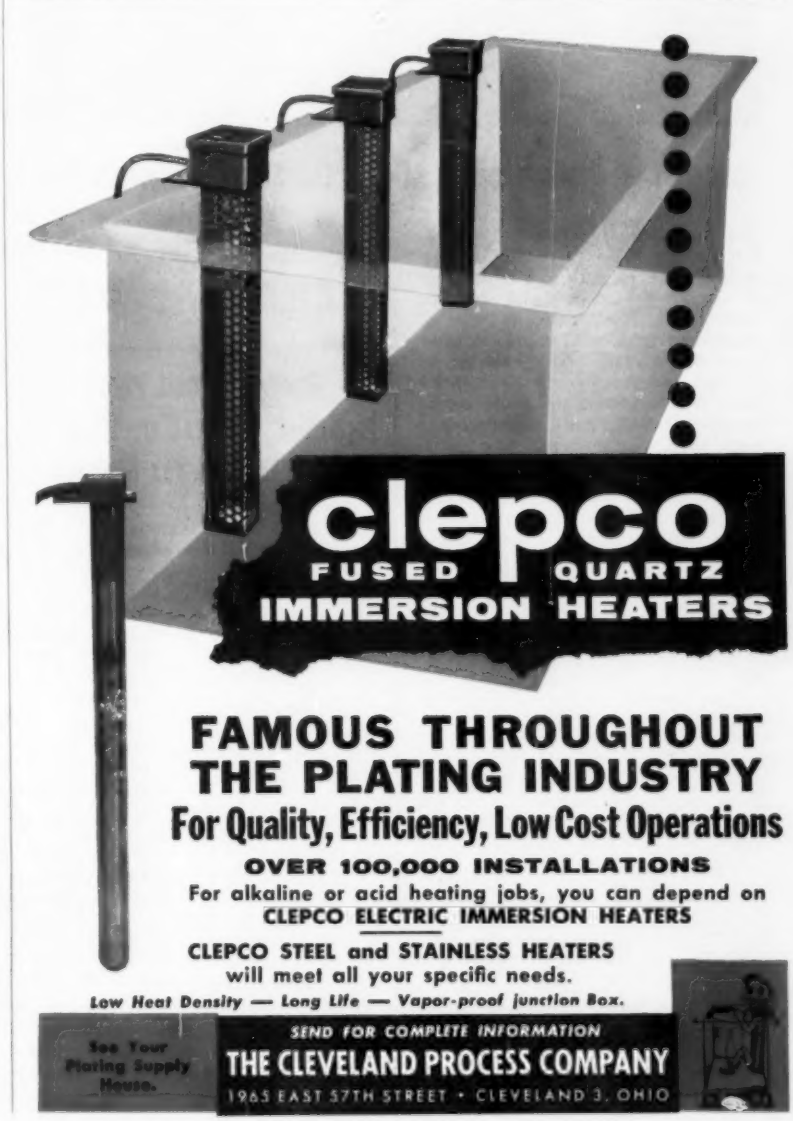
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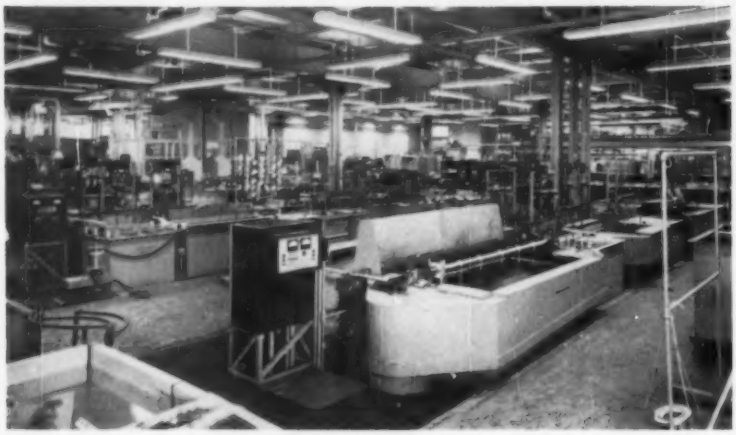

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Several of the country's leading transistor manufacturers have demonstrated that semiconductor products coated with 25 to 50 millionths of an inch of Autronex Acid Gold, easily pass all the rigid performance-acceptance tests. The standard ASTM 96-hour salt-spray test — *in conjunction with the severe mandrel-bend test* — left Autronex gold plate unaffected.

An important step in transistor manufacturing entails a 30 to 40 second dip — (the C.P.–4 etch) a highly corrosive solution of nitric, acetic and hydrofluoric acids and bromine, in order to remove impurities from the silicon or germanium. Most metals dissolve readily in this highly reactive solution. Autronex gold plated transistor headers were suspended in the C.P.–4 solution for *several hours;* the glass seals dissolved... the Autronex gold plate was unaffected.

Autronex Acid Gold plating process' electrolyte is mildly acidic (pH 3.5-4.5), and operates at room temperature. The process produces deposits which are mirror-bright in any thickness directly from the bath, which offer approximately 75% greater resistance to abrasive-wear over conventional gold plate.

A technical paper with complete details on bath preparation and control, equipment required, and charts on physical properties is available free for the asking.

Ask for #AG-2.

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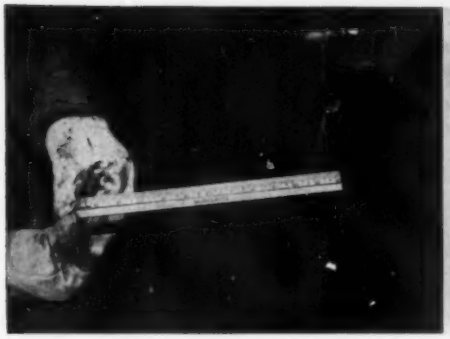


Fig. 1

Fig. 2

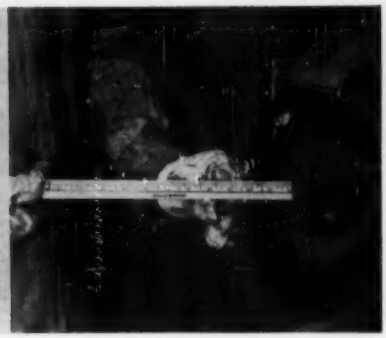


Fig. 3

Here a carbon steel chisel half an inch thick and 12 inches long (Fig. 1) is ground on a coated abrasive resin bond belt (Fig. 2) to a three-inch stub (Fig. 3) in less than one minute . . . and the belt is ready for more work.

ABRASIVE BELT PERFORMANCE INFLUENCED BY SEVERAL FACTORS

by R. W. REED*

IN THE EVER-BROADENING GROUP of coated abrasive products—which runs the gamut from spiral wound strips with an inside diameter of 1/16 in. to the versatile "PG" wheels with outside diameters of 20 in. and more—the coated abrasive belt still functions as a common denominator for the solution of the majority of grinding and finishing problems.

Nothing, to date, has been devised in any abrasive form that will remove stock as rapidly and economically as a coated abrasive belt (see Figs. 1, 2, 3).

And while belts do face some competition in the fine finishing field (from other forms of coated abrasives, brushes,

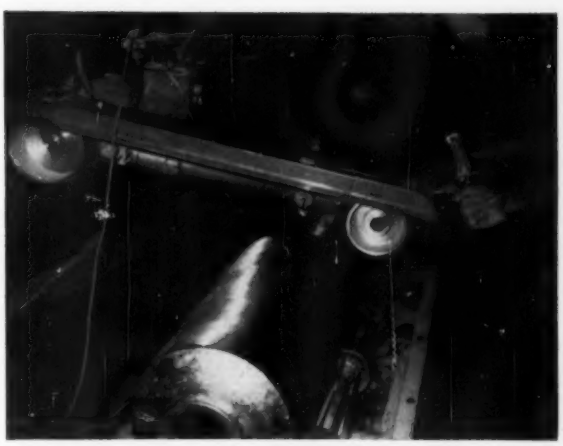


Fig. 4

Here a swing grinder is being used with a coated abrasive belt to put a finish on a tank too large or too heavy to be carried to a lathe.

* Technical Service Engineer, Coated Abrasives Division, Minnesota Mining and Manufacturing Company, St. Paul, Minnesota.

buffs) they still have a great deal to offer and should be regarded as a contender—not simply an alternate—when fine finishing processes are being considered (Fig. 4).

The coated abrasive belt of 1959 does not appear markedly different from its 1939 predecessors—yet it will outcut them by a considerable margin, and yield a far more consistent finish.

Why?

Better technology all around—new adhesives and bondings, improved backings, more advanced methods of manufacture; more efficient machines, most of them especially designed for coated abrasives; and a vastly superior knowledge of what

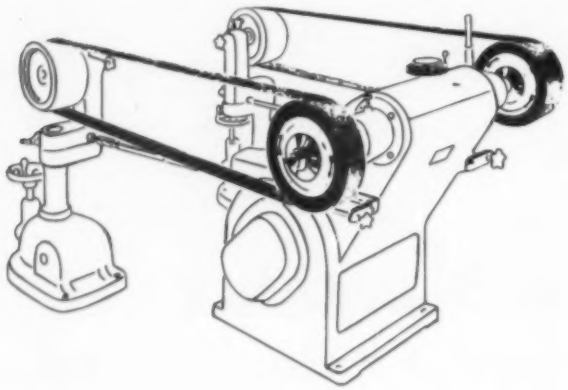


Fig. 5

A double spindle lathe equipment with coated abrasive belts and idler mechanisms to convert it to a backstand—one of the most economical weys in which to use coated abrasive belts.

actually happens during a grinding cycle, made possible by new testing methods and new types of testing equipment.

Still, one of the most important features of the abrasive belt is its versatility. It can be used on portable equipment, or on double-spindled backstands (see Fig. 5). It works well whether the idler mechanism is mounted on the floor; or on the wall or ceiling (see Fig. 6). It is as effective in the one-inch width for polishing scissor handles as it is in the 50-in. widths for prefinishing heavy steel plate. And operations that were marginal with coated abrasives as little as two years ago are now being done at a profit.

Obtaining Productivity From the Abrasive Belt

What sometimes appears to be a premature dulling on the part of the abrasive belt is, in 90 per cent of the cases, due to improper belt usage. It is more advantageous to get the greatest productivity from an abrasive belt, than it is to aim for something rather vague called "longest possible life." The two are not synonymous.

It is necessary to recognize that because the abrasive mineral is on a flexible backing, and because the mineral particles are oriented for sharpness and disposed as to height for continued cut, extreme pressure should be avoided. And when extreme pressure is essential, a coolant-lubricant should be used to share the punishment. Up to 70 per cent of the life of a coated abrasive belt is accomplished with minimum pressure; recognizing this, other factors can be adjusted accordingly.

Some of these "other factors" are: mineral grit size, hardness of the contact wheel which is supporting the abrasive belt at the point of contact with the work-piece, belt speed, type of contact wheel and its size, belt tension and type of mineral. This seems like an imposing list, but the interdependence of one factor upon another simplifies selection, and there are some constants that can be used as benchmarks.

One of these is the premise that softer contact wheels produce a finer finish than harder contact wheels, assuming the same grit belt. Chart 1 (Fig. 7) indicates that where a 90 durometer contact wheel produces an rms of 23, a 30 durometer wheel yields an rms of 10 for a given grit. These readings were taken at the so-called "plateau" of the graph, where rms readings vary only slightly. This plateau accounts for up to 70 per cent of the life of an abrasive belt. (Rms—root mean-square—is actually a measurement, in millionths of an inch, of peak-to-valley variance, weighted toward the deeper scratches.)

Another constant is that higher speeds result in finer finishes, as illustrated in Chart 2 (Fig. 8). This shows the effect of speed when all other factors (contact wheel hardness and size, grit, workpiece, pressure, etc.) are not varied. It is evident that speed works in an inverse ratio to rms; that is, as the speed is increased (within practical limits the rms is reduced. The chart shows that a speed of 3200 surface feet per minute (sfpm) produced an rms reading of 14, and that

Fig. 6

In this instance, to save room, the idler mechanism has been mounted high on a wall to the right (not shown in the picture), giving the coated abrasive belt an angular position which in no way affects its performance.

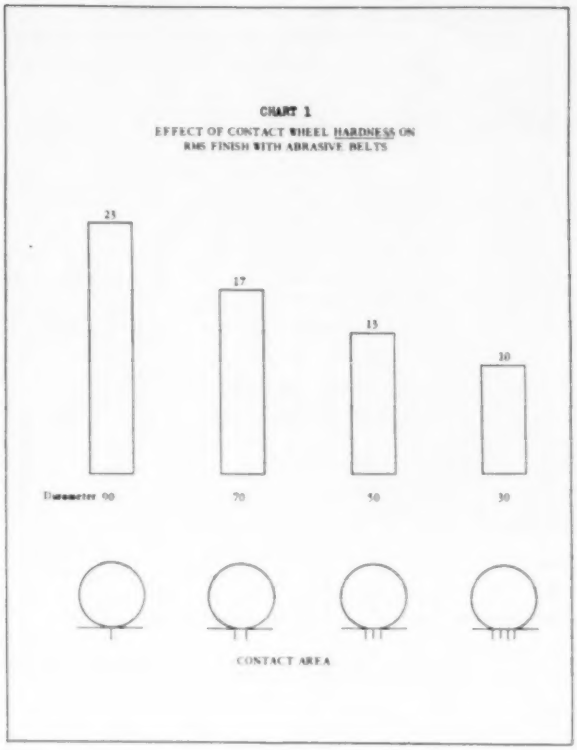


Fig. 7

a speed of 10,000 sfpm resulted in an rms reading of 6; although it should be noted that rms changes very little at speeds beyond 7500 sfpm.

Still another constant is that a larger diameter contact wheel will contribute to a lower rms reading than will a smaller diameter wheel, other factors not varied. This is because on a large wheel the pressure exerted by the workpiece is spread over a larger area, so the pressure per square inch becomes less than with a small wheel. Less unit pressure, in turn, provides a finer finish. And for about the same reason that a larger wheel contributes to a finer finish, so does a softer contact wheel. This is also illustrated by Chart 1 (Fig. 7) which shows that a 90 durometer wheel produces a 23 rms reading (under this given set of conditions) and a 30 durometer wheel contributes to a reading of 10 rms.

The Contact Wheel

The contact wheel is vital to a belt operation because it is, in most instances, what supports the belt. Although some operations are performed unsupported (on the free-of-belt), and a few are performed on a platen machine, for the most part the contact wheel lends the support, and the action of the wheel governs the action and effective penetration of the individual mineral grains on the belt. A contact wheel with a serrated (slotted) face, for example, imparts a different action to the mineral grain than does a plain face wheel. This is illustrated by Chart 3 (Fig. 9).

Here is an instance in which belt life—effective belt life—is lengthened in many cases by using a slotted contact wheel as compared to using a plain face wheel, ultimate results permitting. Slotting the contact wheel increases grinding pressure and has the unique effect of sharpening the mineral grains as they undulate over the face of the wheel. A plain face wheel puts all the wear on one plane on the mineral, and eventually produces a flat surface.

(NOTE: *Slotting is a secondary factor in the selection of a wheel and coated abrasive. The first consideration is still the productive result on the work-piece—not on belt life.*)

The serrated face and wheel durometer are also interrelated factors. Rubber, like water, is noncompressable and when you push on one spot it bulges somewhere else. In slotting, the rubber land can distort into a groove, or void (lands on some types of wheels actually fold over to some extent). This, in turn, increases resilience and conformability, and lowers functional hardness of the wheel. Thus, slotted wheels should have a durometer 10 to 30 points harder than the durometer of a plain face wheel for a given application.

Slot Angles

The angle at which the slots cross the face of the contact wheel contribute to the action of the wheel as much as do the wheel's size, hardness and severity of serration. The angle of the slot is measured from the side of the wheel, (i.e. 90

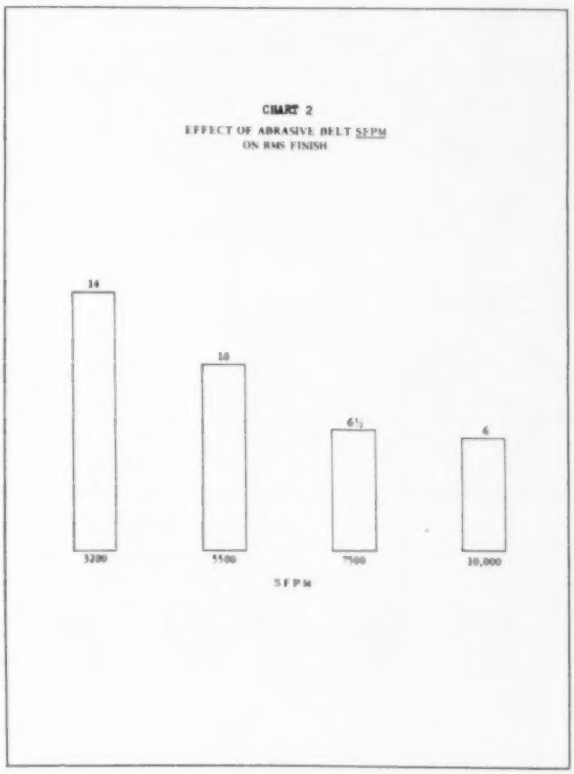


Fig. 8

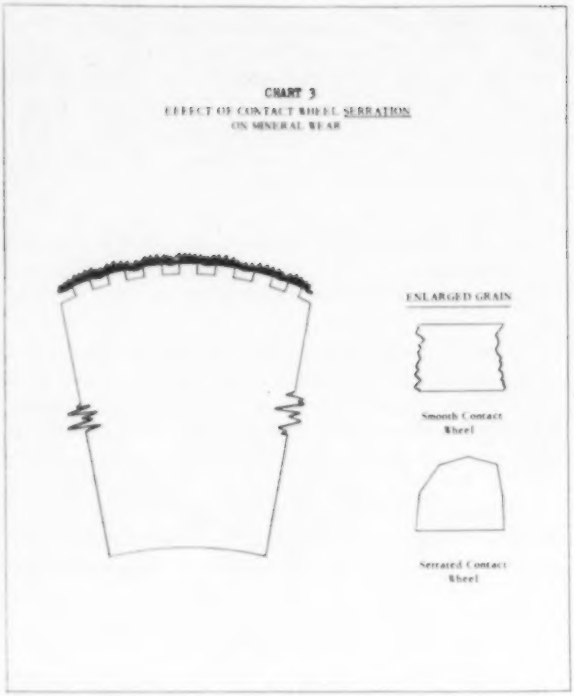


Fig. 9

degrees being straight across the face). Some different angles are illustrated in Chart 5 (Fig. 10). The lower the angle toward seven degrees the finer the finish and the lower the rms reading. Slot angles of 30 degrees or less are usually employed in the polishing operation. The 90-degree angle,

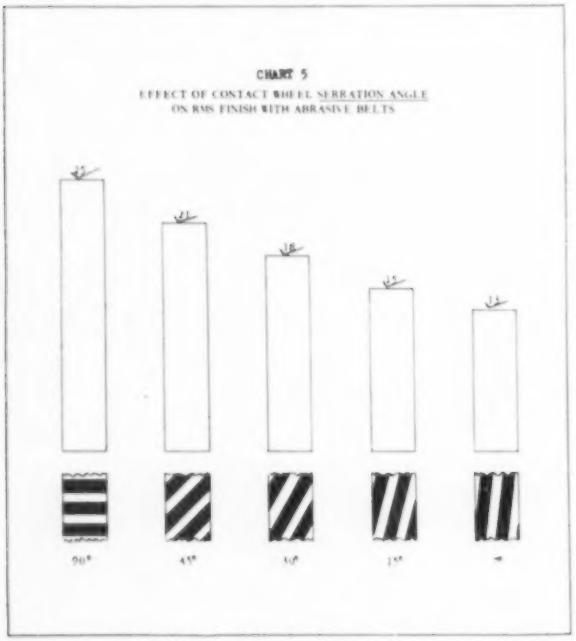


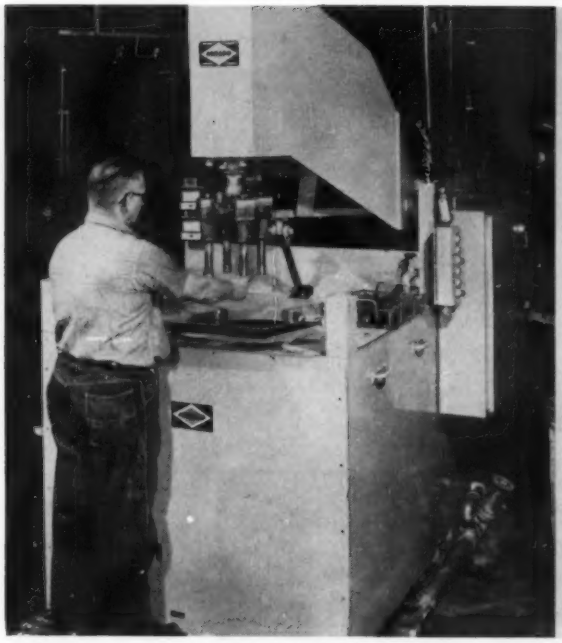
Fig. 10

for all of its aggressiveness and progressive impact action, often makes a siren-like sound and frequently leaves a pattern in the work. The 45-degree angle is aggressive enough for most stock removal operations.

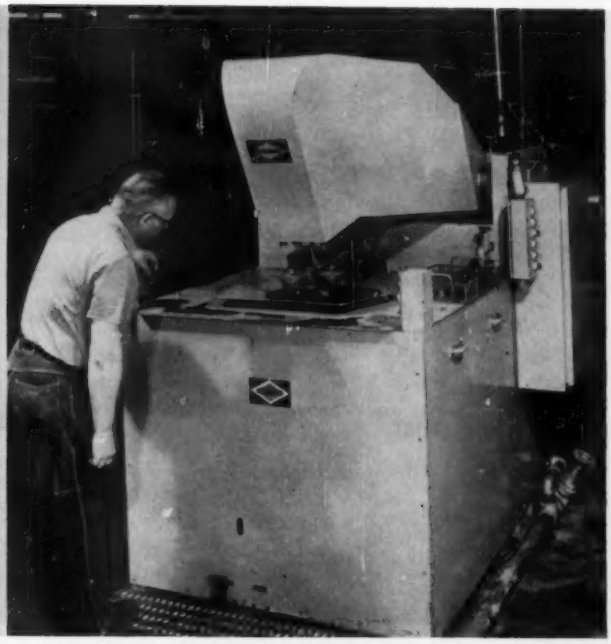
Developments in abrasive belt construction over the years —and especially in the last year or so—have produced a product which is adaptable to any grinding and finishing operation. The backing and the bond, and to a lesser degree the grit, determine the flexibility of an abrasive belt. A rule of thumb regarding flexibility is to use the stiffest (least flexible) belt that will satisfactorily perform the operation, other conditions being satisfied. This is true because in general use the stiffer the belt the more durable it is in the long run.

Recent years have also seen rapid development of special machinery designed for utilization of coated abrasives; and of course standard grinding and finishing equipment is still easily converted to handling them. Whatever the machine, maintenance is important. If belt life seems to be consistently shorter than expected, or if a belt shows a consistent pattern of undesirable wear, take a look at the equipment on which the belt is employed. This includes a regular inspection of spindles, bearings, idlers, contact wheels, speed mechanisms, coolant systems, feed tables, and the like.

R. W. Reed joined the Minnesota Mining and Manufacturing Company in 1946 as a production engineer and two years later moved into the firm's new methods development section, coated abrasives division. After ten years in that capacity, he is now a technical service engineer in charge of field evaluation of new industrial abrasive products. He is a mechanical engineering graduate of Colorado University.



Operator loading parts fixture attached to spindle of spindle finishing machine.



Spindle fixtured parts in half-down position. Parts to be finished are entering rotating abrasive media. Note spindle head.

MECHANICAL FINISHING USING FLOWING ABRASIVE MEDIA

by C. HEAMON CASTLE*

THE METAL WORKING INDUSTRY often uses barrel finishing to overcome troublesome finisning problems. The wide use of barrel finishing equipment and methods has produced tremendous savings and improved finishes on many items. These results have encouraged research and investigation of other methods for finishing parts not conveniently handled by regular barrel finishing methods. In spite of the many favorable characteristics of barrel finishing, it is a slow process in many instances and it is also difficult to place the required equipment in "line" production systems; since the parts barrel finished are usually handled in batch lots. Batch-type operations are fine for handling many types of small-size parts, particularly when the finishing operations are departmentalized. They do, however, have limitations when considering the finishing of many large-size parts; particularly when high production is required and quality is of prime consideration.

Recognizing these limitations and appreciating the need for supplementary finishing processes to handle those parts not readily handled by conventional barrel finishing, a great deal of research and experimental work has been done to produce improved mechanical finishing techniques and equipment. Since the metal working industry has a wide variety of finishing requirements and an equally wide range of products to be finished, necessary efforts to accomplish the desired results are diverse and specialized.

The method used and the degree of specialization often depends upon production requirements and the adaptability of the finishing method recommended for use on some particular part or group of parts having similar size and shape, as well as parts composed of similar materials. For instance, several types of equipment and processes have been proposed for processing zinc base die castings, such as automobile door handles, window regulators and ornaments. Different equipment and processes have been developed for finishing jet engine blades and similar aircraft parts. While both of these examples involve the mechanical finishing of metal parts, both use different processes and finishing materials. The first example indicates the finishing of a relatively soft metal part preparatory for electroplating. The second example involves the finishing of a highly precision complex alloy and extremely tough metal part.

The equipment and processes used in the latter example are based on the principle of a flowing abrasive mass. The abrasive may be fine or fairly coarse depending on the exact application, as does the type and amount used. It is loosely held in a rotating circular tub, and the finishing is accomplished by immersing fixtured metal parts in the moving or flowing abrasive for a definite period of time. The mechanism for accomplishing this is rather specialized and depends upon the size and shape of the part being processed, the production required and the results desired.

Most equipment made to take advantage of the flowing abrasive mass principle utilizes what is known as multiple spindle arrangements with the spindles holding fixtured parts, and rotating them during the processing. The spindles also move vertically to immerse the parts to be finished in the abrasive mass. This arrangement holds the fixtured parts being finished at a location in the abrasive mass where it is rather loose and easily deflected. A more satisfactory system for many parts utilizes a single spindle with either a single or a multiple parts holding fixuture. The machine using this principle has a rotatable tub of abrasive media into which

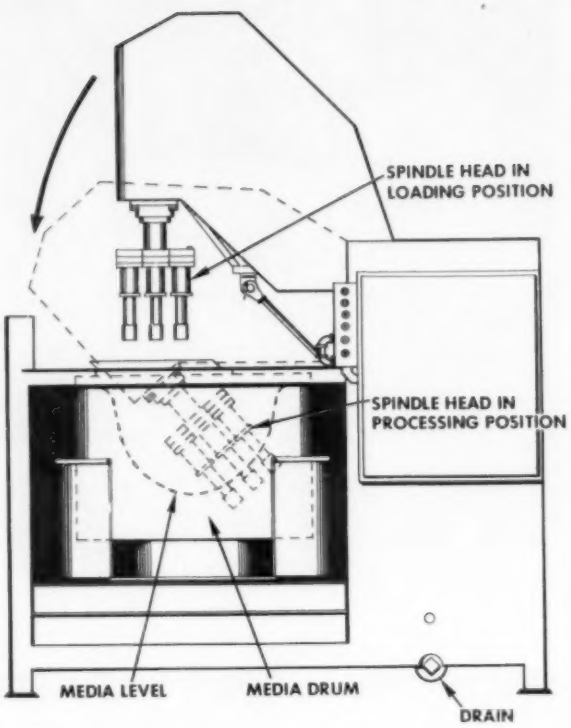
*Vice President and Technical Director, Abrado Finish Corporation, Grand Rapids, Michigan

the spindle-held fixtured parts are immersed at an oblique angle. The advantage of this is that as the tub holding the abrasive media is rotated, the media tends to be forced to the outside edge of the tub; due to the centrifugal force developed by the rotation of the tub and its mass. This causes the abrasive media to build up into a layer of substantial thickness on the outer wall of the tub as well as at the corner where the side wall joins the tub bottom. The layer of abrasive formed as a result of this action is very dense and firm, and by immersing parts to be finished into this layer, the resulting finishing action on the part is very rapid and efficient. By controlling the tub speed, the amount and size of the abrasive media, and the amount of lubrication present, as well as the processing time, a variety of finishing results are obtained.

The finishing machine described* constitutes a mechanical finishing advancement and introduces a new technique for injecting parts to be finished into a rotating mass of abrasive media. This new method of mechanical finishing can reduce finishing time on many parts to as low as 10 seconds and can be used for finishing all types of metals and alloys requiring low cost deburring and finishing with uniform results. It can be used to finish and improve the external surfaces of all types of highly precision-machined parts requiring uniform deburring, radius forming, removal or blending of machining or grinding marks, and improvement of micro-inch surface finish. Part dimensions can be maintained to the close tolerances so important in the aircraft, automotive, electrical, appliance and similar metal working industries. Such applications as refrigerator compressor components, bearing retainer rings and automatic transmission parts as well as aircraft, jet engine and guided missile parts can be finished to predetermined tolerances and standards, without the use of skilled technicians.

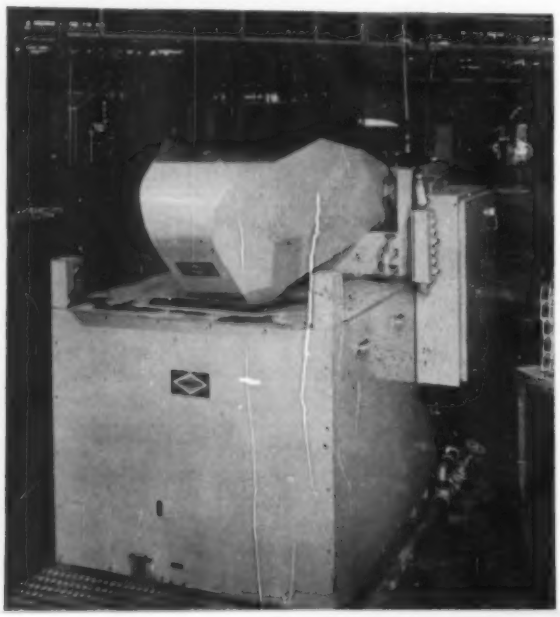
The spindle finishing machine requires a relatively small amount of floor space considering its production potential and can be used advantageously in production line sequence operational plans. The operation can be easily standardized and there is usually no difficulty in maintaining either production requirements or operational standards. Parts fixtures are immersed in the flowing abrasive mass as well as the parts being finished and are subjected to some wear, however, in most cases fixture costs are nominal.

* Abrado-Matic Model TS-31, Abrado Finish Corporation, Grand Rapids, Michigan



Schematic drawing of the unit. Dotted lines indicate position of fixture head in down position and relationship of process mass to work parts during operation.

Fixture head in completely down position. In this position parts are being processed.



EQUIPMENT AND OPERATION

The machine consists basically of a ruggedly constructed frame and housing which supports a motor-driven media tub and a pneumatically activated fixture holding spindle. The rotating tub holds the abrasive media which produces the surface finish action. The air-operated spindle provides a convenient means of immersing the fixture held parts into the rotating abrasive mass. Flexibility of operation is maintained at all times through the use of variable speed electric motor drives for both the media tub and the fixture spindle unit. The air-operated fixtures are designed to hold one or more parts and may be easily removed or changed when necessary. The unit includes a motor-driving pump with connected pipes, sprays, valves, collection ring and sump to recirculate water-based processing solutions containing a suitable chemical compound. Complete control of the processing time cycle is maintained by an accurate electric timer. The established operations sequence is automatically repeated by the manual pressing of the operation starting button. All electrical equipment is housed on an approved metal cabinet attached to the side of the machine for easy access. Operation controls are conveniently located at the operator's station and the operator has complete control of the machine at all times. As an added safety precaution, an emergency master shut-off button is conveniently located adjacent to the operator's station.

The gear at the left has been processed by the method described. The particles in the crevasses and on the shaft on the unfinished gear at the right have been completely removed.

The bearing sleeve on the left has been cleaned and deburred by the new spindle finishing mechine. Note dark splotches on the unfinished sleeve at the right, and the particles in the ridges and crevasses.

The machine operates with a simple procedure which het average operator can master in a very short time. The operation of the machine starts with the placing of unfinished parts in the parts holding fixture attached to the centrally located spindle directly in front of the operator. The operator then presses the starter control button which activates an air cylinder attached to the fixture holding spindle, and the parts are lowered into the rotating abrasive mass. At the same time the fixture is being lowered into the flowing media, the fixture is rotating slowly at a speed, predetermined by experimentation, for the parts to be finished. Through the use of this technique, all exposed surfaces of the parts are subjected to the flowing abrasive action resulting from the rotation of the abrasive media in the tub. At the end of the predetermined time cycle, whether 5 seconds, 20 seconds, or even as long as 5 minutes, the spindle is traveling upward and out of the tub, the finished parts are sprayed with a cleaning solution, removing the loose abrasive particles and residue from the abrading action of the finishing media. The operator can then remove the processed parts by simply pushing a foot pedal which causes the air clamp in the fixture to release the finished parts. At this point, the next processing cycle begins by again placing unfinished parts in the holding fixture and again pressing the operation control button.

PROCESSING CYCLE

The process cycle is generally of short duration compared to similar processes using abrasive media. Often a 15 or 30 seconds processing cycle is sufficient, although longer processing cycles ranging up to five or more minutes may be used. The parts holding fixture may be designed to hold a single part, two parts, or even four or more parts, depending upon their size and shape. An important point to consider is the fact, that since parts are fixtured, there is no danger of impingements, nicks or scratches from parts colliding with one another during the process. Also, the fact that by using different types and sizes of abrasive media, together with appropriate tub speeds, a wide variety of processing conditions can be obtained; which in turn makes this machine and process widely adaptable to a variety of finishing problems.

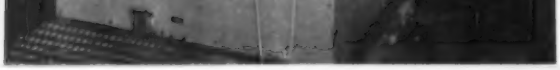
Installation is relatively inexpensive since it does not require special floor or unusual facilities. Floor space required is a modest 8½ by 4½ feet area and over-all height requirement is approximately 8 feet. Normal drainage facilities are desirable and water, air and electrical requirements are those usually available in the modern industrial plant.

Processing media includes a variety of abrasive materials. Aluminum oxide abrasives in a fine grit size are often satisfactory for many operations including light deburring and producting radii on precision parts. Larger size aluminum oxide media are used when greater cut and more drastic finishing action is required. Soft abrasive media and even steel balls may be used for producing fine finishes on soft metal parts such as aluminum die castings and similar items.

Chemical compounds are used to assist; in keeping the media clean and protect the parts during processing. They also can provide lubrication when desired and aid in tempering the abrasive action of the media when a mild abrasive action is required. Generally specific compounds are required for different applications and different materials processed. No one compound performs best for all operations and processing conditions; therefore, it is best to follow recommendations once satisfactory results are obtained and to standardize on the materials suggested to insure continued success of the operation.

The flowing abrasive media type of mechanical finishing operation is not widely used at the present time. It involves principles known for many years; but given little attention due to the fact that they are specialized and, in many instances, production requirements could not justify the use of the methods involved. Spiraling labor costs and the unavailability of sufficient trained or skilled labor also have been a contibuting factor in generating the present interest in this type of finishing. The adapting of new engineering ideas has improved available equipment and made it suitable for modern production applications. Similar improvements have been made by the application of new processing media and related materials. The process itself is finding many new applications due to use of this improved equipment and materials. Continued progress in this phase of mechanical finishing should be assured as more and more production applications are recognized and evaluated.

C. Heamon Castle is technical director of Abrado Finish Corporation. He holds a degree in metallurgical engineering from Michigan College of Mines and Technology where he graduated in 1933. Mr. Castle was formerly employed as technical director and vice president of another Midwest metal finishing company and held that capacity for 14 years. He has devoted the past 25 years primarily in the finishing field holding patents on methods and processes for barrel finishing. Mr. Castle is the author of various articles on barrel finishing.



METALLURGY IN FLAT POLISHING

by ADAM ZIMMERMAN*

INTRODUCTION

THE UNSUNG HERO in a plating operation is the "polisher." He must be part "tool maker" as he often has to remove die marks to achieve the final acceptable form. And he must be part "metallurgist" to remove surface imperfections and forming strains from the part.

The operations he performs to make the surface "suitable for plating" are usually listed as "variable" and are not figured in the cost. This problem resolves itself into two parts—"die marks" and "steel." It is with reference to the steel condition that the following article is presented.

BUYING THE STEEL

The purchase order should always state the name of the part to be made and the producer should be made acquainted with the requirements for the part. This is elementary. But in the case of electroplated parts, the problem is more complex because the surface of the finished part must be mirror bright.

Selection of material is best left to the steel mills as they are most qualified to take this responsibility. To meet the "surface requirement" suitable for electroplating, the steel mills charge a surface extra. The extra book states . . . "Special Surface Requirement 45

"This extra is applicable when sheets are subject to surface removal by grinding. The quality represented by this extra is intended to provide a product especially suited for highly finished end uses, such as automotive bumpers, bumper guards, and similar applications, after removal of a substantial amount of the surface by grinding, either in the flat or formed condition.

"The producer is responsible for performance within properly established limits, with respect to defects such as scratches, pits, slivers and subsurface imperfections remaining after adequate surface removal. Responsibility for defects, other than those listed above, is subject to negotiation."

The reasonable amount of metal which must be removed is generally three per cent of thickness.

FLAT POLISH LEAST EXPENSIVE

Fastest method of removal is by flat polishing. This is done in "one position" as opposed to the multiple wheel positions required when polishing a formed piece.

The cost to prepolish is a function of square foot area and varies inversely as the size of the piece and finish required. Fig. 1 shows the cost of prepolishing as a function of sheet width.

Extremely fine finishes can be obtained by flat polishing and a finish of 5 to 8 micro inches can readily be obtained, which seems to be well-suited for the finish required on bumpers.

STEEL PROBLEMS

From the foregoing the need for good die practice became obvious. Some metallurgical problems have accompanied the development of flat polishing and the improved standards of die practice. Steel defects appear in such forms as "stretcher strains," "orange peel," "coil breaks," and "thin line slivers."

STRETCHER STRAIN

Stretcher strain, a function of yield point elongation, is prevalent in all hot rolled and cold rolled sheets, unless they are properly cold rolled or roller leveled. The defects manifests itself in lines appearing at an angle of approximately 45° to the direction of stress. They vary in intensity according to the amount of elongation which takes place at the yield point.

The defect is minimized by "skin passing," a mill process in which the steel is elongated by cold reduction to correspond to the amount of elongation occurring during the yield point. Since the skin pass operation reduces the total available elongation in the steel, it must be kept to a minimum.

Roller leveling will tend to obviate the strains, but its effects are usually short lived. In extreme cases its effect is as brief as two minutes (if steel temperature is raised to 200F) as in polishing or applying die lubricant which required heat.

"Stretcher strains" appear during the drawing operation usually in areas with less than five per cent elongation.

Stretcher strains can be pulled out of a piece if the part has a minimum elongation greater than the yield point elongation. Whenever possible the dies should be designed to provide enough elongation to eliminate stretcher strains. (See Fig. 2) The method of removal varies with the degree of severity—from steel buffing to polishing with a setup wheel or 180 grit belt.

ORANGE PEEL

"Orange peel" is the product of a coarse grain size. The defect resembles the skin of an orange and varies in intensity with the amount of elongation. The greater the elongation,

SINGLES

Width (In.)	Discount Quantity Price * (¢ psf)	Price (¢ psf)	Width (In.)	Discount Quantity Price * (¢ psf)	Price (¢ psf)
19	8.4	9.25	31	6.6	7.25
20	8.15	9.0	32	6.5	7.15
21	7.95	8.75	33	6.4	7.05
22	7.7	8.5	34	6.35	7.0
23	7.55	8.3	35	6.25	6.9
24	7.4	8.15	36	6.2	6.8
25	7.25	8.0	37	6.15	6.75
26	7.1	7.8	38	6.1	6.7
27	7.0	7.7	39	6.05	6.65
28	6.9	7.6	40	6.0	6.6
29	6.8	7.5	41	5.95	6.55
30	6.7	7.4	42	5.9	6.4

* Subject to quantity requirements and other conditions and services. Above prices based on a minimum length of 60 inches.

Fig. 1

* President, Production Finishing Corp., Ferndale, Mich.

the more severe the orange peel condition. An orange peel surface will appear frosty after electroplating. Coarse grained steels should not be used for plating applications.

"Orange peel and stretcher strain" can occur in the same piece as in the case of a fine grained steel which has a "decarbed skin." (A decarbed skin is a thin layer on the surface which has lost most of its carbon content.) The grain of decarbed steel will tend to grow when subjected to elevated temperatures as in box annealing. In such cases the steel will show stretcher strains in areas of low elongation and will orange peel in areas of high elongation. (See Fig. 3)

Coarse grain in cold rolled sheets is usually a function of chemistry, per cent cold reduction and annealing temperatures. Hot rolled sheets have a finer grain and can be used rather successfully when the draw is not too severe.

COIL BREAKS

Coil breaks occur in heavy guage stock which has been coiled. This defect, resembling the pattern of alligator hide, shows up after forming. This is why the mill recommends sheet stock for plating work. Light gauges of 030–050 can be coiled successfully but will occasionally show the defect.

These problems are discussed to help the polisher, who is blamed for not doing the job right at the flat polishing machine. In reality the problem is metallurgical and the steel mills and die makers should be consulted for relief. The flat polisher is used to remove surface imperfections and to prepare a surface suitable for electroplating.

MACHINE CONTROL AND SETUP

The first step in setting up is to determine how much metal must be removed to effect a cleanup; then, how fine a finish is required. The amount of metal removal required is determined by weighing the piece before and after polishing. Stock removal and finish are a function of the grit size of the belt.

The efficiency of a belt is measured in terms of stock removal versus length. Other factors which influence belt performance are horsepower applied per inch of stock width, traverse speed, grit size and contact roll.

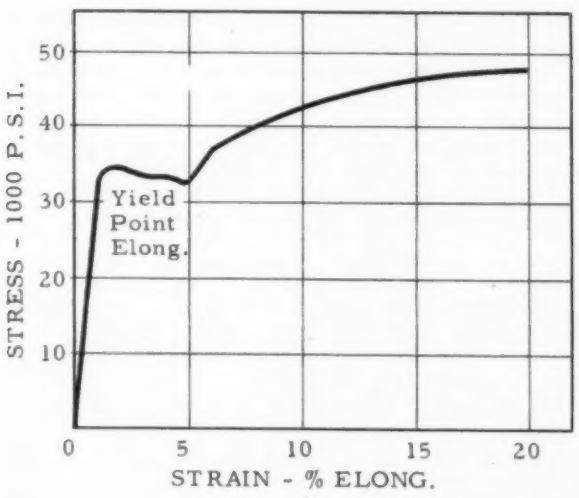
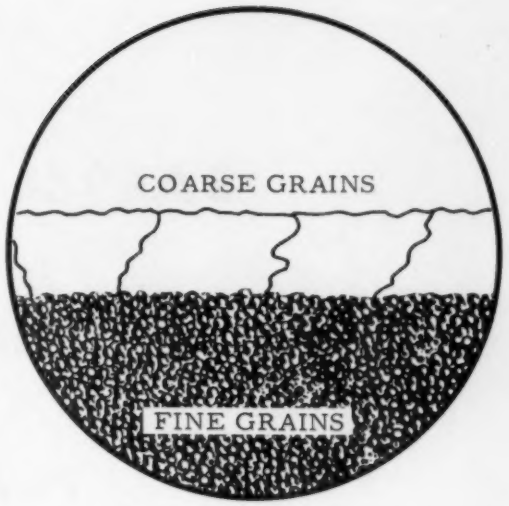


Fig. 2



DECARBED STEEL

Fig. 3

TRAVERSE SPEED

Traverse speed is usually measured in feet per minute. It follows that the slower the traverse speed the greater the stock removal. Therefore the scratch is shorter and easier to cover in plating. That is why a 220 grit finish by hand looks better than a 220 grit finish by machine after plating.

GRIT SIZE

The coarser the grit size, the greater the stock removal and the coarser the finish. Conversely the finer the grit size, the finer the finish, with less stock removal.

CONTACT ROLL

The softer the contact roll, the greater the "shoe" or contact area. A soft contact roll will reduce the horsepower applied per inch and lower the stock removal. But this longer shoe of a soft contact wheel gives greater ability to contour. In contour polishing on formed pieces this is desirable. However in flat polishing it has an adverse effect as it increases scratch length.

Since the surface being polished is flat, the need for contouring is minimized. A harder roll will produce a short scratch and permit high unit pressure, with higher stock removal.

The machine should be controlled by recording stock removal and finish on a statistical basis. The values obtained should remain constant; and deviation can be traced back to horsepower, grit size, etc.

The steel performance should be controlled by heats and the results reported to the steel mill. Report good heats as well as bad heats to help the supplier control the quality of his steel. Mills usually split heats among two or three jobs for correlation purposes. Thus they can evaluate both the quality of metal they are producing and the performance of your flat polisher.

BARREL FINISHING FOR PLATING

by MALCOLM M. MAYNES*

ONE OF THE REVOLUTIONARY finishing processes in the past decade throughout industry, and particularly in the plating industry, has been barrel finishing. In many fields, it has virtually eliminated costly, slow and tedious manual deburring, cleaning and buffing of metallic parts.

Barrel finishing produces a uniform surface finish, edges and corners neatly rounded to prescribed radii and all this in a fraction of the time required by hand methods.

This process is particularly well suited to parts which are to be plated. Since the finish after plating is dependent upon the surface before, a preparation process which can produce uniform, smooth surfaces on such work is of great significance to the plating industry. Each phase of the barrel finishing process can be carefully controlled to assure repeat performance of high quality work.

The process is essentially a simple one. Work to be finished is placed in a closed drum or barrel together with properly sized abrasive, water and a chemical compound. The barrel rotates slowly about its axis, causing the top layer of work pieces and abrasive to continuously slide together thereby providing a gentle grinding action. The chemical compound acts as a lubricant, cleaner or cushioning agent to control the action. The finishing cycle may take from a few minutes to several hours depending upon the work to be done, the size of the parts and other factors.

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A typical example of a part to be plated where barrel finishing meant substantial savings is a buckle part such as those used with webbing straps in a variety of products. Hand deburring of the teeth and edges is very time-consuming and the end product is not always uniform. Tumbling these buckles in No. 5 abrasive (about $\frac{1}{8}$ in.) for two hours removed the burrs and sharp edges and produced a surface suitable for plating.

Die castings present a special problem in finishing. Under the smooth outer skin of the casting is a porous body. If the finishing process cuts through this skin, the part is often ruined. Barrel finishing with a natural stone tumbling medium has been very successful. The light grinding action of the natural stone removes the imperfections and improves the surface finish without breaking through the skin. (See Fig. 1)

In the completely modern and well equipped barrel finishing experimental room are to be found barrels of all types. The main function of this equipment is the processing of samples. The optimum methods for producing the desired results at the lowest cost are determined and this has helped many plants set up their own finishing rooms and achieve substantially lower costs with improved quality.

The elements of the barrel finishing process are the abrasive media, the barrel, and the chemical compounds.

ABRASIVE MEDIA

Aluminum oxide abrasive is used for barrel finishing because it is tough, durable and has the correct density to provide the proper cutting action. Aluminum oxide abrasive is also bonded into special shapes for special situations. Bonded triangles were originally developed to prevent the wedging of the abrasive in slots, recesses and holes. It is somewhat lighter per cubic foot than regular abrasive and in many operations, this is desirable.

Bonded spheres are especially designed for processing parts with intricate recesses or openings. Because of its spherical

shape, this pelletlike abrasive has a free sliding action. Coil springs and tubing are typical of parts which spheres finish better than other types of media.

For die castings and other parts where improved surface is the principal function of the finishing process, a natural stone medium has proved very effective.

These abrasive types would be regular aluminum oxide, bonded triangles, spheres and natural stone.* All in sizes ranging from 2 in. down to less than $\frac{1}{8}$ in.

Barrel tumbling media also include soft steel and zinc shot, and hardened steel burnishing medium. Parts which are fairly small in size and of simple geometric form are frequently tumbled by themselves with suitable compounds and no media whatsoever.

BARRELS

Barrels are made in a variety of sizes and shapes. The number of parts in a production run or the size of the parts is the criterion for size. The shape of the parts can also be a determining factor in the shape of the barrel.

For large production runs, horizontal, octagonal barrels are widely used. These may be divided into two or more compartments. Another popular type is the duplex or twin barrel, usually consisting of a pair of small hexagonal drums mounted on either end of a common drive shaft. These are well suited to the processing of small parts.

Multidrum barrels are available where processing of quantities of small parts of different shapes is to be done. Individual drums can be removed without disturbing the time cycle of the other drums.

Other types include tilting barrels, end loading barrels and submerged types in which the barrel is perforated and runs in a tank which contains the water and compound.

These barrels are usually coated on the inside with rubber or neoprene to cut down the noise, to protect the parts from nicking, and to prevent barrel wear. A timing device to reverse the direction of rotation of the barrel and shut it off at the end of the cycle is a helpful item of accessory equipment. Such a device frequently permits one operator to turn out work in a day with cycles greater than his normal working hours. For example, he can load work before he goes home at night and set it to start in time to be ready to unload when he arrives next morning.

Because of the variety in shapes, sizes and types of barrels, it is advisable to consult an established manufacturer or supplier and let him recommend the correct barrel for the work to be done. A good barrel is an excellent investment.

COMPOUNDS

Chemical compound or cleaners are essential to proper barrel finishing. Selection of the proper type of compound makes possible accurate control of grinding, deburring, scale removal, cleaning, polishing and burnishing of parts. Compounds provide proper lubrication, water softening keep parts and tumbling media clean, prevent abrasive from loading or glazing and develop color or luster on the workpieces.

Compounds should be selected according to the metal or alloys being finished and to meet the needs of the operation. Acid compounds are used for descaling and bleaching ferrous parts. Alkaline compounds are used for the initial cut-down operation on ferrous parts where it is desirable to maintain the natural color. Neutral compounds are used for the final finish on non-ferrous metals.

*Norton Company designates the abrasives, in the same order, as Tumblex "A", "T", "S" and "N".

Fig. 1

Camera accessory parts of die cast metal are abrasive tumbled to prepare the surface for plating with natural stone tumbling media.

Suppliers of compounds can recommend the best one for each application. Time and money can be saved by consultation instead of indiscriminate testing.

After each barrel finishing operation, the barrel should be thoroughly rinsed with water to remove all traces of compound and abrasive fines. After the work has been separated from the abrasive it should be dried. In the case of ferrous parts, a rust preventive should be added unless the parts are to be used imediately in the next manufacturing step.

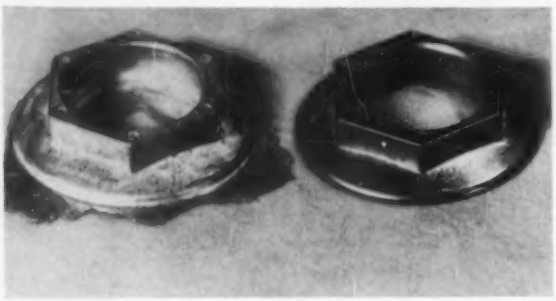
ACCESSORY EQUIPMENT

In addition to the barrel, certain other pieces of equipment are desirable in the tumbling room. Some means of screening the abrasive should be available. As the abrasive media wear down to the next smaller size, they should be screened out to prevent their wedging in recesses or holes in the work. A mechanical or magnetic work separator is very helpful, particularly in the case of small workpieces. Magnets and/or

These die castings are finished with natural stone tumbling media.

rubber coated screens are commonly used for this step. A loading pan into which the work and the abrasive is placed before charging the barrel together with a hoist to lift it is a labor saving device worth buying.

Other aids for increasing the efficiency of the barrel finishing operation are cold and hot water for rinsing purposes, compressed air, graduated beaker for use with compounds,



This photograph shows the excellent flash removal capabilities of the barrel finishing process on die cast parts. Besides removing the flash, the process improves the surface finish without breaking through the outer skin of the casting.

weight scales, and a card index file for maintaining a record of barrel finishing procedures.

SIZE OF ABRASIVES

(1) Select the grit size or mixture of sizes of tumbling abrasive to fit the size, shape and condition of the workpieces and the finish requirements. The ratio of abrasive to parts depends chiefly on the nature of the operation as well as on the size and shape of the workpieces, and may vary from two parts abrasive to one part work up to a ratio of six or more to one.

(2) When a mixture of abrasive media is required to reach all desired areas, care should be taken to use the proper ratio of selected grits. Too high a percentage of fine size will tend to over-cushion and retard the cutting action of the coarser size. On the other hand, if the proportion of fine size is too small, it will have little value. Ratios may vary from one part to one part, to three parts of fine to one part of coarse.

(3) If the abrasive media are too coarse for the job, the "grinding action" may be so severe it will dub or peen the edges instead of abrading them. The softer the metal, the easier the edges can be so damaged and, therefore, the finer the abrasive should be.

(4) On the other hand, if the abrasive is too fine in proportion to the size and weight of the workpieces, nicking may result. If a coarser abrasive size cannot be used because of the finish requirements, adding a carrier like blocks of wood, will supplement the action of the abrasive in retarding the motion of the workpieces sufficiently to prevent nicking.

(5) In forming a radius on the part being tumbled, the size of the abrasive used is more important than the time cycle; the larger the radius desired, the larger the abrasive should be.

SCREENING THE ABRASIVE

The abrasive should be screened after each run or after several runs so as to keep it well graded and thereby eliminate contamination of any given size with undersize particles. By rescreening periodically the smaller sizes as drawn off can be used for processing smaller parts for which they are best suited.

The resizing of the abrasive undoubtedly will result in a certain amount of undersize abrasive. An equivalent amount of new abrasive should be added to the charge to maintain the original ratio of abrasive to workpieces. Otherwise, if the first abrasive load is used over and over again for the same operation, it will be necessary to eventually increase the tumbling time to compensate for the slower rate of cut of the reduced size abrasive particles. Also, as mass of media diminishes, damage to work will occur because mass height will become dangerously low. Some concerns have adopted the practice of rescreening the abrasive daily and adding the required amount of new abrasive to maintain good cutting efficiency and adhere to established time cycles.

The abrasive should be kept graded at all times to eliminate oversize and undersize particles that might wedge in the workpieces.

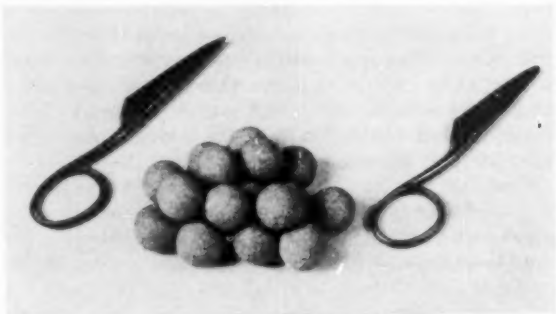
DEGREASING

Parts having a grease or oil coating should be degreased before the barrel-finishing operation. Of course, there are many instances where the degreasing can be done more economically as a separate cycle right in the tumbling barrel. Sometimes a five-minute run with an alkaline compound will serve the purpose quite well.

It is imperative that parts to be plated and have an absolutely chemically clean surface.

LOADING THE BARREL

Generally, the abrasive, workpieces, compound and water are added in this order to the proper barrel level (average



Scissor parts are abrasive tumbled in abrasive spheres which are especially designed to finish surfaces such as the inside of the finger grips. Sharpening and assembly complete the scissor making operation.

approximately 55 per cent of capacity, however parts easily damaged are often loaded to a height of 75–90 per cent). If the parts available are not in sufficient amount to reach the proper level, compensate with abrasive. Jog the barrel to insure a good mix of abrasive and work before starting the run.

When the ratio of abrasive and parts has been established, an optional method is to pour the abrasive into the loading pan, add the workpieces and then tip the charge into the tumbling barrel. Before starting up the barrel, jog it a few times forward to further imbed the parts in the abrasive and so prevent nicking.

A third method, sometimes used is to load the barrel with abrasive and parts in layers.

NOTE: It is highly desirable to be able to run the barrel in reverse as well as forward inasmuch as some parts should be tumbled for a certain length of time in one direction and the barrel rotation then reversed in order to get uniform results. Intricate shaped or heavy parts as well as racked parts are in this category.

RACKING, PLUGGING AND MASKING

Heavy or intricate shaped parts are often racked in special fixtures to protect them against nicking. The racking fixture in every case should be designed for the part to be finished. Racked parts should be run for half the cycle in one direction and the barrel rotation then reversed for the second half of the cycle. A timing device is especially convenient to regulate such time cycles.

Holes, recesses, slots, etc., that must be protected should be plugged with rubber, wax, paper, wood, putty, etc. Edges that must be left sharp should be masked; a plastic dip coating or even lacquer is sometimes used for this purpose.

BARREL SPEEDS

For parts which are somewhat heavy, or have relatively heavy or flexible burrs, the barrel should be started slowly in order to produce a gentle barrel grind and avoid rolling over the burrs; then increased to normal speed after the burrs are removed.

For delicate, easily distorted parts or parts that are quite heavy, the barrel should be run continuously at a relatively slow speed.

WATER LEVEL

In any cut down operation, this especially when abrasive is used, as little water as possible should be used. If this were not done the water will constantly wash away the abrasive so that the abrasive compound would be practically wasted and the time cycle would be very much lengthened. Water in itself is a cushioning agent and must be handled with great caution. It is always wasteful to use any more water then is absolutely necessary in a cut down operation. Naturally, if the work pieces are of such a nature that they need a great deal of cushioning, higher water levels may be employed, but not otherwise.

COMPOUNDS (Cleaners or Chemicals)

Select the type of compound according to the metal or alloys being processed. For roughing ferrous parts, use a water-soluble, nonlubricating (alkali type) or only slightly lubricating type (burnishing) compound 1 ounce (approx.) or less per gallon of water. Over-lubricating the charge will reduce the cutting action.

When using acid type compounds as recommended for descaling purposes, the barrel charge should be thoroughly rinsed after the run, then neutralized with an alkaline type of compound and finally rinsed again before proceeding to either the roughing or finishing operation.

If the barrel lining should become coated with oil or grease from the workpieces, it can be removed with a good cleaning compound. Run the barrel for approximately 10 minutes and then rinse thoroughly.

SPOT CHECKING

To determine if all the machine tool marks have been removed in the cutdown cycle, inspect by buffing a part lightly. This will remove any mottled or scratch pattern surface left by the tumbling operation.

When stock removal of parts is required or parts must be finished to a precise radius or microinch reading, inspect periodically before the final finishing operation.

RINSING

Always rinse the barrel thoroughly before starting a new run.

Rinse the barrel and charge thoroughly when changing from one compound to another as any traces of one compound when mixed with another may produce undesirable results.

This typical manufactured product is abrasive tumbled to remove heat treat scale and form small radii as well as to improve the surface finish for subsequent operations which might well include plating.

A bright finish or "color" can be obtained only when the barrel and charge have been thoroughly rinsed before the final finishing operation; cleanliness is all important here. To remove the tumbling residue when changing from the roughing to the finishing cycle, fill the barrel with water and revolve it three or four revolutions with the strainer cover on. Repeat this operation is necessary until the water runs out clean.

If a higher "color" is desired, at the completion of the regular finishing operation, rinse again thoroughly, add a fresh charge of water and cleaner and run the barrel for approximately 15 minutes or more.

Finished ferrous parts should be immersed immediately in a rust preventive solution to protect them from rusting or spotting. A wire basket is convenient for this purpose.

UNLOADING

Take care not to nick the finished parts when unloading from the barrel. If hand separating screens are used unload slowly and remove the large parts as they drop out. Place the screen as closely as possible to the bottom of the barrel

A production type barrel is unloaded at the end of the cycle. Barrel finishing is particularly well suited to the finishing of large numbers of small parts such as these spindles. It is far more economical than hand processing.

in order to reduce the distance of drop to a minimum. The use of rubber-coated screens will help protect the finish.

WASHING

Immediately upon completion of the run, the parts should be thoroughly washed to remove all traces of abrasive and compound. In any subsequent machining, plating, soldering, or welding operation, fine abrasive or compound deposits on parts may cause difficulty. If the parts are of a ferrous type, the water should have a suitable rust preventive agent added.

DRYING, OILING AND RUST PREVENTING

Immediately after washing, the parts should be either dried, oiled (with a water displacing oil) or dipped in a rust preventive solution.

The parts can be dried either in corn cob or sawdust, spin dryers, hot air blowers, or infra-red lamp drying units.

The choice of oiling method depends upon whether the parts require short term protection as in the case of parts that have to be machined, or long term protection for parts to be stored.

If the parts are to be plated, they are generally dried and routed as quickly as possible to the plating room.

CARE OF BARREL AND EQUIPMENT

Rubber or neoprene lined barrels are generally preferred and recommended to reduce the noise factor which accompanies steel shell drums, and for cushioning many type parts. The barrels should always be thoroughly rinsed with water between runs.

While the neoprene or rubber lining will not absorb chemicals, care must be taken not to use cleaners that will attack the rubber. Also, care must be taken not to damage the rubber lining around the barrel opening with the loading pan or cover. If the loading pan has protruding sharp edges, they should be covered in some way with a cushioning material. It is even more important to use a mouth opening loading guard as more lining failures come from operators banging a hoist pan on the opening to clear the pan than from sharp edges of the pan.

CONTAMINATION OF ABRASIVE

When cleaning the barrel in preparation for a new run, care should be taken to remove all of the abrasive previously used. Any particles allowed to remain in the barrel will contaminate the abrasive used in the next run if it is of a different size. Larger particles may ruin the finish; smaller particles will cause trouble by wedging in oil holes, slots, etc. For the same reason, the unloading pans, separator screens and canvas unloading boot should be thoroughly cleaned before changing to a different size abrasive.

Precautions against contamination from compounds has already been emphasized under "Rinsing."

Malcolm M. Maynes is a Norton Company sales engineer specializing in abrasive grain applications. Mr. Maynes entered the employ of Norton Company in March of 1937. His first position was in the order department, and he then became expediter, planning department. Prior to his present position, he was assistant to superintendent in the grain and bond plants.

Mr. Maynes was graduated from the Millbury Public Schools and Becker Business College. During World War II, he was with the United States Army.

A resident of North Grafton, Massachusetts, he is married and has two children.

He is a member of the American Society for Metals, American Society of Tool Engineers, and the American Electroplaters' Society.

CONTINUOUS X-RAY MEASUREMENT OF PLATING THICKNESS

by PAUL S. GOODWIN and CHARLES L. WINCHESTER*

THE ABSORPTION OF X-RAYS has long been used to determine thickness of materials. More recently, gamma radiation has been successfully applied to these measurements. Such methods, however, are usually not applicable to the measurement of plating thicknesses since it is difficult to isolate the absorption due to the plating from the total.

There is, however, a property of x-rays which can be utilized for making this distinction. When a high-energy x-ray beam falls upon matter, secondary fluorescence radiation is generated and emitted from within the material itself. This phenomenon is similar to the visible light produced by an ordinary fluorescent lamp. The basic difference is that the radiations occur in different portions of the electromagnetic spectrum, the wavelengths of x-rays being very short. In both phenomena, part of the excitation energy is scattered and part is absorbed and transformed into the secondary fluorescence radiation.

Just as the color spectrum of a fluorescent lamp denotes which phosphors the lamp contains, the x-ray spectrum of a material denotes which elements are present. Each element, when irradiated with high-energy, heterochromatic x-rays, emits fluorescence radiation at wavelengths characteristic of that element. The useful spectrum range is between 0.35A and 2.8Å. By proper selection of the wavelength to be measured, elements from calcium (atomic number 20) to cerium (atomic number 58) can be determined by their K-spectra and elements up to atomic number 100 by their L-spectra. Under certain circumstances, the K-spectra of potassium (atomic number 19) also can be used.

The intensity of the fluorescence radiation is directly proportional to the thickness of the material being irradiated. Thus, by simply collecting this radiation and determining its intensity by means of electronic instruments, we have a measure of plating thickness.

Two procedures have been employed in these measurements, the direct and indirect (absorption) methods. The former is a simple determination of the intensity of fluorescence radiation emitted by the coating element itself. The indirect method measures the intensity of radiation emitted by the base material rather than the coating material. The amount of radiation absorbed as it passes through the coating layer is related to coating thickness. Which of these methods is used in a given application is dependent on three factors: relative thickness, mass absorption coefficient, and density of the coating. Criteria for the choice between these methods will be discussed in subsequent paragraphs.

As mentioned above, part of the excitation energy is scattered and part is absorbed. Recently, the scattered radiation has been found to furnish an excellent means of standardization.[1] An intensity ratio between the scattered radiation and that emitted by the coating element is determined. Because the ratio method utilizes a comparison of two x-radiations developed simultaneously in the sample, the method is considerably more independent of changes in sample position, condition of the plating surface, line voltage, and x-ray tube output than is the case with single channel instruments using the absolute method.

Increased emphasis on automation throughout the plating industry has induced the study of means to achieve continuous analytical control of production and inspection systems. X-ray fluorescence offers several important advantages over other conceivable methods, particularly when applied to the analysis of chemical elements. No physical contact with the sample to be analyzed is required. Further, for most materials, x-rays do not cause any permanent changes in the sample being measured, so that, in general, the method may be considered nondestructive. This feature is, of course, essential for continuous analysis on a production line, as any permanent change in physical characteristics of the material cannot be tolerated.

The information content of both the fluorescence radiation and the scattered radiation coming from the surface of the sample being measured is very large. In this way, x-ray methods usually are far superior to other noncontacting, nondestructive methods which are usually based upon measurement of a single physical quantity.

Further, in the direct method, since only the plating material atoms provide measurable radiation at the selected wavelength, a very accurate measure of the total plating element is obtained. Impurities in the plating, surface treatment (remelted, oily, mat, etc.), or diffusion into the base metal do not affect the analysis significantly.

X-RAY FLUORESCENCE ANALYZER

A diagram illustrating the instrumentation for measuring plating thickness utilizing the methods described is shown

* Applied Research Laboratories, Inc., Glendale, California.

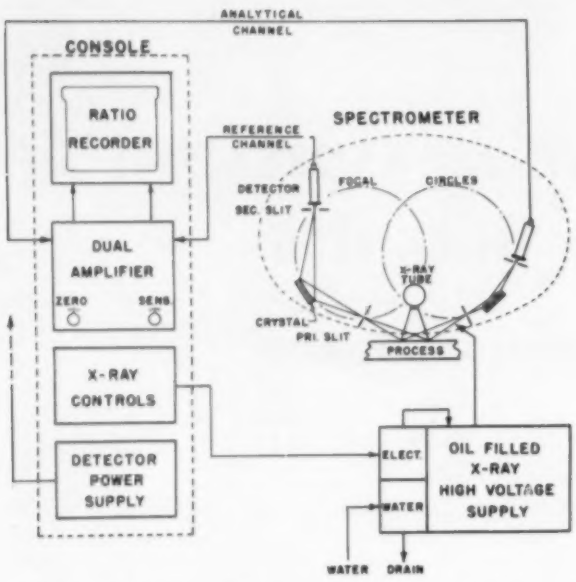


Fig. 1. Block diagram of essential components of the x-ray fluorescence analyzer for measurement of plating thickness.

in Fig. 1. The analyzer is composed of three units, spectrometer, high voltage power supply and recording console. Each will be discussed in subsequent paragraphs.

For continuous measurement on a production line, one x-ray fluorescence analyzer is required on each side of the plated strip so that both individual side and total coating information can be obtained. A spot of approximately 3 in. diameter is irradiated by the main x-ray beam emanating from the side-window x-ray tube. The power supply may be situated close to the line while the recording console may be located up to 300 feet away. The mounting arrangement of these assemblies, particularly the spectrometer, is flexible to make easy adaptation of the x-ray unit to a production process.

Versatility is further provided by adapting the analyzer for manual operation. As shown in Fig. 2, the spectrometer is mounted on legs and equipped with a sample chamber. This arrangement permits one instrument to be used to control several batch operated lines. Samples are presented to the spectrometer and the coating weight is indicated by the recording console a few seconds later.

THE SPECTROMETER

This unit is 30 in. wide, 18 in. high and 29 in. deep. Mounting bosses along each edge of the width and along the back permit the spectrometer head either to be rigidly mounted to a framework or moved along rails or ways to permit traverse over the production process. The head may be oriented in any direction, permitting analyses of either the top or bottom of the product.

Within the cast spectrometer housing is a water-cooled, tungsten target x-ray tube, and two monochromator-detector channels. The latter may be either dispersive or nondispersive. Dispersive channels employ a primary slit, a curved lithium fluoride crystal diffracting element, and double Geiger detectors. Nondispersive channels employ a combination aperture and collimator system together with one of a number of detector types, e.g., Geiger tube, scintillator, or proportional counter.

Fig. 3 illustrates spectrometers mounted on either side of a continuous tin plating line in a leading manufacturing plant. The x-ray beam is directed to the plated sheet which passes one inch from the spectrometer housing. The resulting fluorescence and scattered radiation passes through primary slits which bracket the x-ray tube. The secondary radiation then impinges on curved lithium fluoride diffraction crystals which separate the desired wavelengths from the total radiation emitted from the sample. The selected wavelengths are brought into focus at secondary slits just preceding the Geiger detectors. Linkage mechanisms attached to the crystals allow the individual channels to be adjusted for maximum output. Other than these linkages, all other mechanical variables are locked by dowel pins and clamps, eliminating the need for adjustment.

THE HIGH VOLTAGE POWER SUPPLY

The power supply tank contains a full-wave rectified and filtered supply which can deliver up to 60 kilovolts and 50 milliamperes of low ripple power to the x-ray tube. Components are immersed in transformer oil to insure against corona disturbances. In addition to the kilovoltage generator, this assembly contains the water-cooling controls and safety interlock circuitry associated with the operation of high-energy, continuous-duty x-ray tubes.

THE RECORDING CONSOLE

The heart of the console is the strip-chart recorder. This self-balancing potentiometer measures the ratio of the unknown input signal (intensity of plating element radiation) to the internal standard signal (intensity of scattered radiation from plating element). Because of the high impedance level of the signals obtained from the Geiger detectors, and the

Fig. 2. Quantrol® coating weight gauge manufactured by Applied Research Laboratories, Inc.

Photograph Courtesy of Kaiser Steel Corporation.

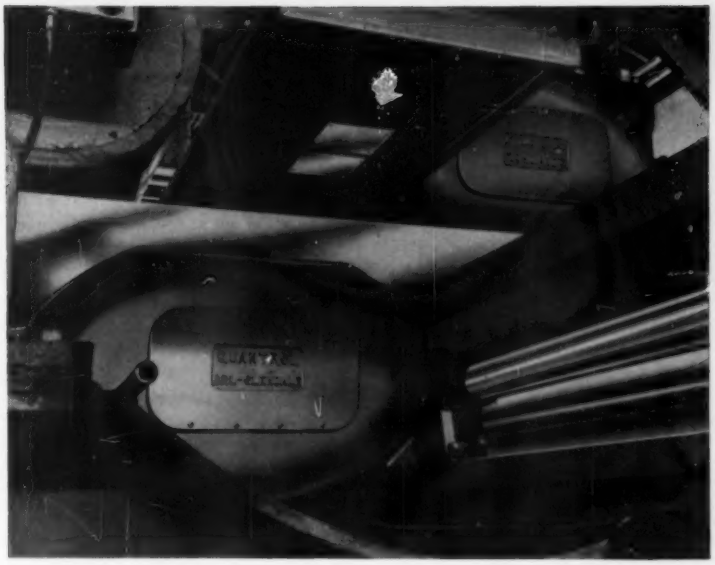


Fig. 3. Spectrometers mounted on a continuous strip plating line for 24-hour control of plating deposits.

need for proper calibrating networks, a ratio amplifier is interposed between the Geiger tubes and the recorder. This chassis contains dual networks which match the Geiger output to the recorder in such a way that the coating weight is expressed in conventional units.

PERFORMANCE ON TIN PLATE

The indirect or absorption method of measuring tin plating weight can be affected to a small extent by the composition of the steel base and to a significant degree by the purity of the tin. Also, the formation of a tin-iron alloy interface layer by remelting the tin for brightening affects this absorption measurement. The direct method of determining plating weight by measuring $K\alpha$ radiation from the tin itself is to be preferred since, in this method, these factors exert negligible effect.

Also, by measuring the emission of tin radiation, the Geiger current output increases with increased tin thickness, while it decreases logarithmically when the absorption measurement is used. The larger signal current, representing a greater number of photons, provides increasing accuracy as thicker tin coatings are measured by the emission system, while the reverse is true with the absorption system. Thus, the x-ray unit, by using the direct method, obtains its greatest accuracy on the thickest tin platings, yet provides accuracies of ± 0.01 lb/bb on the thinnest platings.

PERFORMANCE ON HOT-DIP GALVANIZE

In contrast to tin plate gauging where the coatings are thin and the plating can be measured directly, hot-dip galvanize x-ray units employ the fluorescence absorption principle. Zinc coatings on steel, which are considerably thicker than tin plate, cannot be measured directly since heavy zinc has a great tendency to absorb both the impinging x-rays and fluorescence radiation at its own wavelength. This absorption characteristic is utilized by measuring the base iron radiation absorbed by the zinc plate. A monochromator selects the wavelength of iron radiation to be employed. Over-excitation of the plated product reduces the effect of variations in applied voltage. Further, the indirect method permits adaptation of the x-ray fluorescence analyzer to different plating systems in the same plant. Thus, by making only simple adjustments, the one instrument can be used, particularly by the smaller manufacturer, in the production of heterogeneous plated metals. In this conversion, the internal standard principle of scattered radiation is retained, so there is no sacrifice in the instrument's ability to remain independent of plating line conditions. Also, a special accessory removes the logarithmic function, so that the recorded results are presented in linear units on the chart.

Table I shows the theoretical maximum thicknesses of plating materials which can be measured by the direct method and for representative base materials by the indirect method.

TABLE I

Plating Material	Direct Method	Indirect Method		
		Iron Base	Copper or Brass Base	Lead Alloys Base
	(Inches)	(Inches)	(Inches)	(Inches)
Chromium	0.000152	0.0007	0.0013	0.0027
Iron	0.000169	———	0.0008	0.0017
Nickel	0.000190	0.0013	0.0025	0.0013
Copper	0.000220	0.0012	———	0.0012
Zinc	0.000278	0.0023	0.0024	0.0012
Selenium	0.000630	0.0023	0.0026	0.0059
Silver	0.000785	0.0005	0.0008	0.0018
Cadmium	0.000990	0.0005	0.0009	0.0020
Tin (bright)	0.001400	0.0005	0.0010	0.0022
Gold	0.000058	0.0003	0.0004	0.0007
Lead	0.000102	0.0004	0.0007	———

To calibrate the instrument on a galvanize line, the spectrometer head is traversed to an off-line position where standard plaques of plating are presented to the instrument. Though more may be used, two standards usually suffice—one near the low end of the coating range (i.e., near zero weight), and the other near the maximum or full scale of the range. To bring the x-ray fluorescence analyzer into agreement with the standards, two controls within the console called Zero and Sensitivity are respectively adjusted to bring the recorder pen to the proper value. Once this is done, the instrument is fully calibrated and may be returned to the line.

The galvanize x-ray unit operates from zero thickness coating up to a weight of 1.00 oz/ft² per side (2.00 oz/ft² total). Above this weight, the intensity of the iron radiation disappears into the background because the zinc is too thick for effective penetration of the iron signal. The basic instrument is capable of measuring zinc foils and electrolytic zinc platings to an accuracy of ±0.015 oz/ft² and a precision of ±0.005 oz/ft². These figures must be increased slightly for hot-dip galvanize because of imperfections in the product itself.

OTHER PLATING METALS

Table II shows a comparison between chemical and x-ray analyses of electrolytic copper, brass, nickel, and zinc on steel. Accuracy is shown to be extremely high. It is believed that the x-ray analyzer may have extensive application in plating systems in addition to those herein discussed.

TABLE II

Plating	Wet Chemical	X-ray	Difference
	(Inches)	(Inches)	(Inches)
	0.000135	0.000135	0
Copper	0.000152	0.000152	0
	0.000276	0.000270	−0.000006
	0.000371	0.000377	+0.000006
	0.000057	0.000054	−0.000003
Brass	0.000076	0.000079	+0.000003
	0.000097	0.000096	−0.000001
	0.000098	0.000099	+0.000001
	0.000086	0.000086	0
Nickel	0.000087	0.000087	0
	0.000218	0.000218	0
	0.000353	0.000353	0
	0.000146	0.000146	0
Zinc	0.000148	0.000148	0
	0.000289	0.000288	−0.000001
	0.000323	0.000324	+0.000001

CONCLUSION

The authors have attempted to point out the important advantages of x-ray fluorescence over wet chemical methods in the measurement of plating weights. The instrumentation required for x-ray spectrochemical analysis is described. Not only is time and money saved by having the analyzer located directly on the production line, but noncontacting and nondestructive continuous analysis is provided. Accuracy and precision are shown to equal or exceed wet chemical values. Indeed, in the galvanize industry, the accuracy exceeds that of statistical control. The ratio recording console presents results in desired units on a continuously operating strip chart. Consequently, the line operator can determine immediately if nonuniform or differential coatings are being produced and can take remedial action.

Process control employing x-ray fluorescence is a logical, easy, and, in the long run, economical step for the electroplating industry. In the hot-dip plating plant, such instrumentation can function to improve the manufacturing process, resulting in savings of time, labor, and money.

REFERENCE

[1]Andermann, G., and J. W. Kemp, Scattered X-rays as Internal Standards in X-ray Emission Spectroscopy, Analytical Chemistry, **30**, No. 8, August 1958.

Paul S. Goodwin received his Electrical Engineer degree from Stanford University in 1947 and is a registered Professional Electrical Engineer in the State of California. He conducted systems studies on airborne radar for Sperry Gyroscope Co., Great Neck, Long Island from 1942 to 1945. He supervised development and design of a mass spectrometer for Consolidated Electrodynamics Corp. in Pasadena, California until 1953 when he joined Applied Research Laboratories as Engineering Division Manager. Since 1956, he has been Analytical Systems Division Manager. Mr. Goodwin has several patents issued and pending and several of his technical papers have been published. He is a senior member of the Institute of Radio Engineers and an associate member of the Society of Sigma Xi.

Charles L. Winchester received the BS degree in Chemistry from the University of Michigan. After a year of postgraduate studies at Columbia University, he returned to the University of Michigan for the MS degree in Chemistry in 1950. He joined Oakite Products in New York City as a research chemist and, in 1954, became technical writer for Standard Packaging Corp., Clifton, N. J. In 1956, Mr. Winchester joined Walworth Co., New York City, in the same capacity and, upon relocating in California, joined Applied Research Laboratories as Advertising and Sales Promotion Manager. He has published several technical papers and articles. Mr. Winchester is a member of the American Marketing Association and the Sales Promotion Executives Association.

TROUBLE-SHOOTING IN THE PLATING ROOM

Notes from a lecture delivered by Mrs. W. COULSON to the Melbourne Branch of the American Electroplaters' Society at the Royal Melbourne Technical College on July 17, 1958.

When the work in an electroplating shop shows obvious defects, the trouble can generally be traced to one of the following:

(1) The nature of the basis metal,
(2) The preparation of the basis metal,
(3) The plating solution,
(4) The equipment or
(5) The human factor.

A common source of trouble is porosity of the basis metal, particularly when oil or grease has been used either for rust prevention or as a lubricant with dies or rolls in earlier processes. This was evident in one case when severe blistering of the cadmium plate on some sheet-steel parts occurred. A sample was stripped and then boiled in distilled water. A distinct oil-film on the water resulted. In another case, similar metal was pickled in sulfuric acid. It was so contaminated that an oil-film could be skimmed off the acid.

Porosity of the metal, without contamination, can cause porosity in the electrodeposit. This can often be overcome by a low-current strike which allows the internal surface of the pits to plate and avoids partial bridging of the defect. This takes advantage of the phenomenon known as micro-throw.

For zinc-base die castings, special buffiing techniques have been developed to overcome porosity. Some polishers seem to be able to close the pores by flowing the metal surface on the buff. Though few have acquired the skill, such procedures have been used to reclaim rejects.

In the second category, troubles arise from the buffing process and from ineffective cleaners, dips and swills. The residues from some buffing compositions are difficult to remove. Some silicate cleaners leave a film not removed by subsequent pre-plating operations. Excessive delays must be avoided in the various steps of the process before the work reaches the plating bath. Oxide films, sometimes invisible, form and cause trouble later. Separate acid dips should be provided for steel and copper-base alloys. If a common dip is used, it invariably contains copper. This deposits on steel as an immersion coating which has the usual poor adhesion.

These faults all give rise to blistering and peeling of the final electrodeposit.

In the third class, a very common source of trouble is encountered—the plating solutions themselves. Because the plater knows this, he is liable to exclude the other four potential sources of trouble.

Chemical analysis of a plating electrolyte does not always provide the answer. Some constituents can not readily be determined by the chemist. When a bath has been in use for a considerable time, the decomposition products of the original chemicals, plus foreign substances, can complicate the situation. For example, the determination of Rochelle salt in a well-used cyanide copper bath can be very difficult. Some of the constituents of a bath can only be determined with special apparatus such as a spectrophotometer, etc. These include the organic addition agents and trace metal impurities.

Care should be taken that a sample submitted to the analyst is representative. An accurate analysis of a poorly-taken sample is useless and misleading. The bath should be thoroughly stirred before sampling and the sample-bottle should be clean and rinsed with small portions of the solution before filling. The bottle should be fitted with a glass stopper. A piece of paper rolled up is not satisfactory. Corks should only be used when they will not affect the sample and, therefore, they are not suitable for chromium-plating solutions.

The effect of small amounts of both metallic and organic impurities varies with different bath formulations. Some show a higher tolerance than others. Chemical analysis should be considered, therefore, in conjunction with plating tests. Hull cell and bent cathode tests should be done when the bath is operating satisfactorily. When trouble occurs, they can be repeated and the results compared.

The ductility of a copper or nickel deposit can be assessed by plating a test strip coated with a thin film of albumin. This allows the deposit to be peeled from the basis metal. Simple bend-tests indicate whether the metal is more or less ductile than usual.

Anti-pitting (wetting) agents can conceal the presence of oil in a bath by forming a stable emulsion. Where skimming would otherwise remove the oil, treatment with activated carbon is necessary. The carbon purification will also remove some of the organic brighteners and levelers. The carbon should never be added to the solution in the plating tank. The solution should be pumped to a spare tank. After treatment, the solution is filtered and re-circulated to this tank, until perfectly clear, before it is returned to the plating tank.

The density of every plating bath should be checked with a hydrometer frequently and after the bath has been mixed thoroughly. An analysis is an expensive way of finding out that part of the bath has gone down the drain when the make-up water was accidentally allowed to run too long.

Among the equipment troubles are those which originate from anode condition or placement, current distribution, racking and poor anode and cathode bar contacts. On one occasion, rough copper deposits were caused by very small particles of anode copper migrating to the cathode. These were actually seen in bright sunlight. The trouble was remedied by putting the anodes in loosely-fitting, open-weave bags. Closely woven materials were found to cause anode-polarization due to limitation of solution replacement at the anode surface.

A current-density meter can be used to determine the current distribution to various sites on a plating rack and to check the placement of the individual anodes. It can be used to check anode condition and to locate those which have "corroded down to the hook". Absolute measurement of current-density by the instrument may not tally with other estimates. This can be due to poor current-distribution, inaccurate estimation of work areas or to defective meters.

Personnel problems are unlimited in variety. It is sound policy to encourage operators to advise the senior plater of a mistake. This allows corrective measures to be taken early and may avoid the more difficult task of working backwards from the reject to establish the cause of the trouble.

Many platers are top class men, despite inadequate theoretical training; they have learned from experience. By plating tests, they study the behavior of a new type of bath and observe the effect of altering the various factors, one at a time. They also study the work put through the bath from day-to-day, and learn to recognize the early warnings of trouble. This enables them to take the right corrective action before the crop of rejects appear. A good plater studies his rack load of work through the cleaners, dips and swills, etc., right to the finished job.

An efficient trouble shooter must use his eyes and interpret what he sees from his essential resources of logic and experience.

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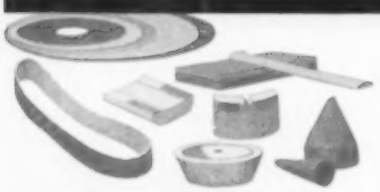

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PREVIEW OF FUTURE PLATING ISSUES

FEBRUARY 1959
A strong issue presenting technical and scientific articles enriching knowledge in electroplating, metal finishing and allied arts, plus general articles of wide readership interest on the Golden Jubilee generally and, particularly, on the AES's SIXTH INTERIM MEETING and its Golden Jubilee Convention and Industrial Finishing Exposition, including the Fifth International Conference on Electrodeposition and Metal Finishing.

•

MARCH 1959
ORGANIC COATING. The importance of organic finishing to electroplaters is increasing rapidly. New and review material will be presented in this third annual edition.

•

APRIL 1959
RESEARCH ISSUE. A feature will be its documentary section embracing the AES's Research Program in American and Canadian universities and foundations, including an historical summary by Dr. William Blum plus a status report on current research projects by AES's current Vice Chairman for Research. Also other technical and scientific papers plus Golden Jubilee news and developments.

•

MAY 1959
PRE-GOLDEN JUBILEE CONVENTION. A larger than usual issue featuring both technical and scientific papers, together with important coverage of Golden Jubilee Convention, Exposition and International Conference news and data of broad readership importance.

•

JUNE 1959
GOLDEN JUBILEE. A unique feature issue climaxing the Fiftieth Anniversary observance of the American Electroplaters' Society, PLATING's parent, it will be targeted both for immediate interest to PLATING's global circulation and for long retainment as an AES reference source and as a memento of this year-long observance.

•

AUGUST 1959
WATER AND WASTE TREATMENT. Another edition of this widely popular feature issue.

•

NOVEMBER 1959
AIRCRAFT. Electroplating and metal finishing in the aviation industry will be featured in this third annual edition.

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STUTZ
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PLATING BARRELS

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Motor drive integrally mounted
Complete cycle
Continuous rotation from one operation to the next
Cog belt cylinder drive
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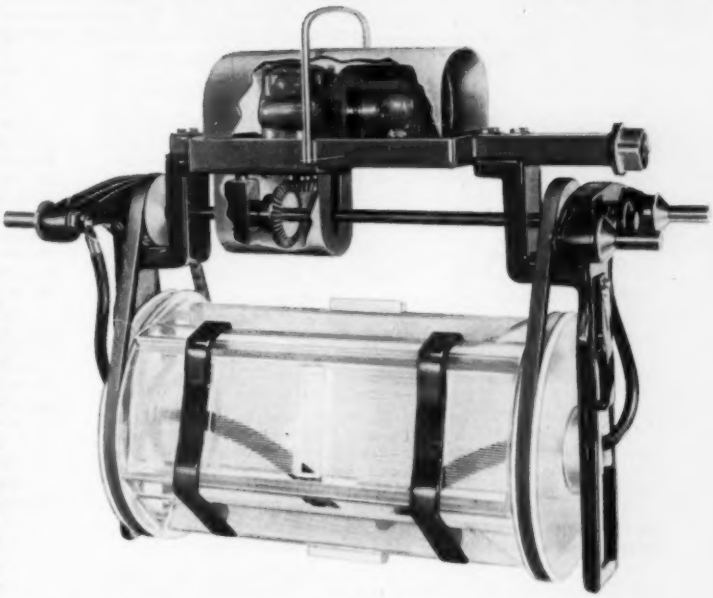

The Stutz Co. has advanced plating barrel design and construction so that today these units are highly productive and maintenance reduced to a minimum. Costly replacement parts such as cylinder gears and bearings are eliminated completely. The only expendable parts are the belts. To provide long belt service, a special non-stretch cog belt with internal steel reinforcement is used. Belts can be changed, if necessary, in seconds at the tank without tools. The Stutz hanger extends below the cylinder thereby adding protection to the cylinder and also permitting the assembly to be lowered to the floor. The Stutz assembly incorporates a lock-in design that permits removal of the cylinder instantly from the hangers without the use of tools. This means cylinders with special perforations or partitions can be installed or removed quickly.

The motor-combined unit shown affords special economy since drives on tanks are not required, and rotation of the cylinder can be continued from one operation to the next. Solution dragout is therefore reduced to a minimum. This design is ideal for application on the carriers of a full automatic conveyorized plating machine.

The motor drive to the countershaft is through bevel gears operating in a gear case and permanently lubricated. Standard R.P.M. of the cylinder is 5; however, other speeds are obtainable at no extra cost. Hanger arms completely covered with fused plastisol.

The initial cost of belt driven units is substantially lower than gear driven barrels, and maintenance virtually eliminated.

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GOLDEN JUBILEE
1959

Many letters of greeting have been received by American Electroplaters' Society (AES) congratulating its members upon the Fiftieth Anniversary of their Society. As the AES enters 1959, its Golden Jubilee year, some of these are published with the appreciation of AES to each and every well-wisher for his gracious expression.

"I appreciate this opportunity of extending my personal and official congratulations and best wishes to the American Electroplaters' Society on the occasion of its 50th Anniversary. New Jersey claims you, not only as a resident corporation, but also as a New Jersey product, considering that your first president and your first editor were New Jerseyans.

"The AES has reason to be proud of its accomplishments over the past 50 years. I wish you many more years of continuing progress."

ROBERT B. MEYNER
Governor
State of New Jersey

"It is a pleasure to extend greeting to a New Jersey organization, the American Electroplaters' Society, Inc., on the occasion of your Fiftieth Anniversary of service to electroplating.

"I would like to extend my best wishes for your continued success and my earnest hope that you will continue your program of service to the field of electroplating."

CLIFFORD B. CASE
United States Senate
Washington, D. C.

"May I take this opportunity to express my sincere congratulations on the occasion of your Fiftieth Anniversary and on your splendid contributions over the many years.

"I know you must take great pride in your record during the past fifty years and I know, too, that you will continue in the performance of your work with the same high quality of service."

LEO P. CARLIN
Mayor
Newark, New Jersey

"On behalf of the National Bureau of Standards, I take the important occasion of the Golden Anniversary of the American Electroplaters' Society to send warm expressions of friendship to the Society members, to note with appreciation the Society's many contributions to science and technology, and to seek the continuing successful cooperation between our two organizations. We send assurances of our interest in the future of the Society and extend wishes for growth and productivity over the next half century and beyond.

"Special recognition of this significant event in the history of your Society is noted on behalf of members of the Bureau's staff who are also members of the Society, on behalf of the Chemistry Division and the Electrodeposition Section. Above all, these Bureau scientists have come to appreciate the excellent technical service given to the Nation by the Society. It is a point of pride to our Bureau that members of our organization have made valuable contributions to the Society's activities.

"Our two organizations have to our mutual benefit shared areas of technical interest for fifty years. May we continue to do so."

A. V. ASTIN
Director
National Bureau of Standards

"This is the kind of letter that I am most happy to write —to congratulate the American Electroplaters' Society on its Fiftieth Anniversary!

"You have reason to be proud of the accomplishments of your Society and its members in the wide field of service which you render to American industry.

"On behalf of the National Chamber, I wish you continued success in the years ahead."

WILLIAM A. McDONNELL
President
Chamber of Commerce of the United States

Robert B. Meyner

Clifford B. Case

Leo P. Carlin

A. V. Astin

W. A. McDonnell

A HALF CENTURY OF SERVICE TO ELECTROPLATING, METAL FINISHING AND ALLIED ARTS
GOLDEN JUBILEE
1959

"In this fiftieth anniversary year of the founding of the American Electroplaters' Society, America is facing the greatest challenge of her existence in the field of scientific and technological research. Research has become our investment in the future. Serious consequences will follow our failure to keep pace with the technological demands of our modern civilization.

"All the membership of AES can be rightfully proud of the role your Society has played in the advancement of American technological knowledge. Your cooperative research program, tailored to benefit both large and small businesses with its broad and useful fact-finding projects, deserves our hardiest commendation. For it provides many companies which are too small to bear the expense of complex research alone vital technical know-how.

"Your Society has achieved a remarkable record of service to our national well-being in improving the general standard of living. Many products which are essential to our daily lives have been developed and improved through the advancements in electroplating and metal finishing fostered by the AES.

"I want to extend my warmest congratulations to you on your Golden Jubilee. Since the founding of AES in 1909 you have done a noteworthy job in advancing our industrial technology. I wish you every success in your coming convention and in your research program in the years ahead. America needs societies such as yours to meet the tremendous challenges of our modern civilization."

PETER W. RODINO, JR.
House of Representatives
Congress of the United States

"I am happy to send greetings and felicitations to your Society on the happy occasion of your Fiftieth Anniversary.

"Back in 1909 when the pioneering group of foremen platers met in New York City to form a non-profit association devoted to the advancement of the science of electroplating, they could not have foreseen the rapid development of American industrial technology in the next half century. However, these men did have the foresight to realize that there would be a vital need in a growing America for an educational society to foster greater technical and scientific knowledge to supplement private industrial research.

"Looking back over the last fifty years, the members of AES can take great pride in the noteworthy accomplishments of their fine organization. You have served your country well. In the years ahead when America must utilize every ounce of her intellectual, scientific, and technological capabilities to meet the challenge of our world today, the AES must continue to be in the front ranks in its contributions to our technological advancement. AES must once again demonstrate the foresight of its founders in expanding and accelerating its vital research program to cope with the swelling scientific needs of our nation.

"On this your Fiftieth anniversary I send you my heartiest congratulations for a job well done, and I wish you great success in your research and educational programs in the years to come."

HUGH J. ADDONIZIO
House of Representatives
Congress of the United States

"Greetings and congratulations to the members of the American Electroplaters' Society on the fiftieth anniversary of your organization.

"During the half century since your Society was founded, electroplating and metal finishing have made important contributions to our national progress and well-being. There is not a doctor's office, hospital, laboratory, school, or home which does not provide many proofs of the skill, ingenuity, and enterprise of the electroplater and metal finisher. The years ahead will see many more evidences of your invaluable work.

"My best wishes to each of you as your organization begins its second half century."

MARION B. FOLSOM
Former Secretary
Health, Education, and Welfare

"Congratulations on your Golden Anniversary! Fifty years of progress serving the Electroplating industry has, without doubt, contributed mightily to our nation's progress and, while the average citizen may not fully realize it, he owes to you a debt of gratitude.

"As you look forward to the next fifty years of service to mankind, you have our good wishes for even higher achievements in enriching the technical and scientific knowledge and advance so important to our future.

"We are proud to have your Society represented in the American Society of Association Executives through your fine Executive Secretary, John P. Nichols."

GLENN B. SANDBERG
Executive Vice President
American Society of Association Executives

P. W. Rodino Jr.

Marion B. Folsom

H. J. Addonizio

Glenn B. Sandberg

A PLATING MAGAZINE original feature during this observance fiscal year of the FIFTIETH ANNIVERSARY of its parent, American Electroplaters' Society, Inc.

NO "bull market" had ever before existed in American finance such as the "Great Bull Market" that prevailed in 1929. Prognosticators looked around them, then persuasively labelled what they saw as "America's Finest Economic Hour." In the canyons of Wall Street, relatively few believed that the market's hesitation in September 1929 was anything more than a momentary lull much less that disaster lay ahead.

Finally that mid-October, the dam cracked. Tuesday, October 29, it crashed. "Black Tuesday" wrote history as the stock market's most catastrophic day. Thousands saw their life savings disappear. Ahead lay the nation's grimmest depression. The stock market collapse was merely the first thunder of an economic hurricane of worldwide proportions.

National income dropped from $83 billion in 1929 to $40 billion in 1932. Some 13 million were unemployed by mid-1933. Many of those with jobs took pay cuts. This was a day of foreclosures—of bank closings—of incomeless men and women selling apples on street corners—of business stagnancy—of loss of confidence—of stark fear.

During that span, AES members, like all families and individuals of that era, felt the whiplash of depression. The Indianapolis and Worcester Branches fell by the wayside in 1933. Branch resignations and suspensions swelled. Compared with few elections and few reinstatements, Branches in 1933 reported many resignations and many suspensions.

The Society's financial situation became such by late spring 1932, that the Supreme Society, at the Philadelphia Convention that June, ordered that MONTHLY REVIEW return to its QUARTERLY REVIEW status for one year as a major economy phase of AES's retrenchment. AES's technical staff in the Research Section of the National Bureau of Standards was reduced from 6 to 4. In order to help bear the financial load, AES's official journal, when it came back as MONTHLY REVIEW in September 1933, carried product advertising for the first time in Society history. AES liked the result so well that product advertising came to stay.

A NEW voice in the White House early in 1933 inspired the nation out of its doldrums by that historic fighting speech, "This great Nation will endure as it has endured, will revive and will prosper. So, first of all, let me assert my firm belief that the only thing we have to fear is fear itself—nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance." Then followed the famous "First Hundred Days" of the new administration whose philosophy was bold, persistent experimentation. ". . . Take a method," it asserted, "and try it. If it fails . . . try another. But above all try something. The millions who are in want will not stand by silently forever while the things to satisfy their needs are within easy reach."

The nation's psychological response to the Hundred Days, including such experiments in industrial self-government as the National Industrial Recovery Act (NIRA), was striking. Optimism returned. The rusty wheels of industry started to gain momentum. The nation's credit structure was salvaged. By 1936, the country was substantially back on the prosperity track. National income had mounted from $40 billion in 1932 to $60 billion in 1936.

The AES was in the very midst of the fight for economic revival. As a Society of individuals rather than an Association of companies, the AES had no part, of course, in the codification of industry negotiated under the NRA. By influencing member opinion as to need for heightening standards of quality, it shared nonetheless in the movement for higher quality. Example of member sentiment in this connection is the statement in MONTHLY REVIEW by F. F. Pierdon of the Baltimore-Washington Branch who said, "Even though the AES is not in a position to officially discuss such questions as wages and hours, it is the logical organization to propose standards of quality that may be incorporated into the Codes. It is important, therefore, that all members of the AES become familiar with the plans of the NRA."

And as business recovery gained ground, and earning and spending power grew, AES resignations and suspensions dropped and applications, elections and reinstatements rose to increasingly greater extent. 1934, in fact, became a cited year. "In all the history of electroplating," wrote Past President George B. Hogaboom, "there has never been such definite progress toward the goal of the AES as there has been in 1934. The completion of the work and the report of the research on 'The Prospective Value of Electroplated Coatings on Steel,' has made history."

ANNOUNCING THE FIRST

MEMBERSHIP DRIVE MONTH

OF THE AMERICAN ELECTROPLATERS' SOCIETY DECEMBER 1935

HERETOFORE, we have been inclined to sit back and wait for prospective members to come to us. Now, with industry on the upgrade, and assistant foreman eligible for membership, we owe it to the science and industry with which we are affiliated, to contact every potential member in the United States and Canada during December. This will make it possible for these fellow artisans to meet with us for the discussion of mutual problems, education, research, helping themselves and at the same time adding to our strength.—

T. F. Slattery
PRESIDENT

(From November 1935, Monthly Review)

MILESTONES OF AES

THE AES had streamlined itself for greater progress early during that eventful decade. In 1930, it had incorporated itself as a New Jersey non-profit educational corporation instead of New York. In 1931, it had launched a program of electroplating courses in its respective Branches. That same year, it had inaugurated a Bureau of Education. Upswing enabled both to receive even greater cultivation.

The Society, moreover, had matured to even greater participation in national and international conclaves and assemblies. In March 1934, for instance, a Congress of Metals in London held under the sponsorship of the Faraday Society, marshaled the greatest assembly in scientific history to that day, of scientists who had devoted their lives to the study of metals. The United States and the AES were represented there by (quoting Past President Hogaboom), "the best qualified man in the electroplating field, William Blum."

In 1930, the AES had chartered two Branches, namely its second Pacific Coast Branch, San Francisco, and a Branch in Anderson, Indiana, that died, by the way, in 1938. From 1930 to 1936, no new Branch was added to the AES network. With economic recovery, however, AES Branch expansion resumed. Today's strong Branch in Springfield, Mass., entered the AES family in 1936 together with a Branch in Binghamton-Elmira, New York, that became Binghamton-Syracuse in 1939.

The New Haven (Conn.) Branch and the Buffalo (New York) Branch of this day were both born in 1938 shortly after the short-lived, so-called "recession" of 1937-1938.

And in appraising electroplating advancements to that day, articulate George Hogaboom had this to say in part:

> It was not until about 1918 that some attention was given to the need of a better understanding of the principles of electrodeposition of metals. . . . It is due today to electroplating that books are universally available. . . . Paper currency is printed from plates made by electrodeposition of iron . . . our metal coins are embossed in dies that have been chromium plated by methods developed long after 1918 . . . the general public has become, within the last ten years, 'electroplating conscious'. . . . Progress can be no better illustrated than to note the increase of nickel for plating in the past twenty years. . . . Previous to 1920, about 500,000 lbs. of nickel were consumed as salts and anodes. In 1937, some 11,500,000 lbs. were used in electroplating. . . .

Charles H. Proctor as he appeared some three decades after founding the Society (Gulf of Mexico, January 1940).

IN ASSIMILATING its growth as the AES observed its Thirtieth Anniversary in 1939, it streamlined its Award System. As a result, the following were the media through which it thereafter recognized and honored individual and Branch achievement in enriching knowledge in electroplating, metal finishing and allied arts:

FOUNDERS GOLD MEDAL for the best paper by an Active Member on electroplating or allied subject.

AES GOLD MEDAL for the paper adjudged best by the Awards Committee prepared by an AES member whether Active or Associate.

PROCTOR MEMORIAL AWARD for the best paper entered into competition by anyone, member or non-member.

SAM HEUNEFORTH AWARD for the best Branch paper. Any Branch winning three times, kept the silver cup.

METAL INDUSTRY CUP for the best Branch exhibit. In addition, there were individual exhibit awards.

Hence, as AES celebrated its three-decade birth year in 1939, it had not only recouped its substantial losses of the depression period but had also made quantitative and qualitative headway. Compared with about 1500 members in 1929, it had some 1900 members in 1939. As against 25 Branches in '29, its family was composed of 28 Branches in '39, these spread from the Atlantic Ocean to the Pacific, from the St. Lawrence to the Mississippi Rivers.

AES's horizon was never brighter but around it, there was gathering chaos of war abroad and the transformation of the United States itself into the Arsenal of Democracy.

—JOHN P. NICHOLS

Outing of the Boston Branch, Hull, Massachusetts, July 25, 1936

AES THANKS . . .

We take great pleasure on congratulating the American Electroplaters' Society on their forthcoming **Fiftieth Anniversary** year and we plan to note this occasion in several issues of our publication during 1959.

In March, which I believe is the month of the actual anniversary, our editorial page will be devoted to this subject. In June, we will, of course, feature the **Fiftieth Anniversary,** convention and exposition, and we are as you know cooperating with the American Electroplaters' Society in the preparation of a historical exhibit at this exposition which will include a number of items connected with the early days of the AES.

With best wishes for your continued growth and progress, we are

METAL FINISHING
Palmer H. Langdon
Publisher

●

In 1959 the American Electroplaters' Society completes 50 years of progress. This, certainly, is an occasion for celebration and for congratulation.

During these fifty years, plating has grown from a neglected stepchild to an industrial giant. The AES has grown from a small group of foreman platers, banding together to help one another find answers to plating problems, to a membership of some 8,000 located in many countries of the world. As a technical society, the AES has aided the advance of electroplating from the status of an art to that of a well-established science. . . .

It is, therefore, a pleasure and a privilege, to send you, on behalf of the entire staff of PRODUCTS FINISHING, sincere congratulations on the occasion of the **Golden Jubilee** of the AES. At the same time, I should like to express the firm belief that in the next 50 years the Society will make even greater progress.

PRODUCTS FINISHING
Ezra A. Blount
Editor

●

Plating Management is most happy to offer its congratulations on the **Fiftieth Anniversary** of the American Electroplaters' Society.

The true success of man is not measured by his age alone, but by his contributions to society. Nor does success come sans human effort.

So it is with the American Electroplaters' Society. Its short 50 years of progress have contributed much "for the advancement of electroplating, metal finishing, and allied arts" throughout the world, thanks to selfless, courageous, and farsighted forefathers of our Society, many of whom were job shop platers.

May the same spirit of friendliness, cooperation, and helpfulness continue to flourish within our industry, as it did in days gone by. To this end, we of PLATING MANAGEMENT are sincerely pledged.

PLATING MANAGEMENT
P. Peter Kovatis
Editor

Melbourne Branch Leads at 8-Month Mark

AT THE EIGHT-MONTH point, namely from April 1, 1958 to December 1, 1958, the Melbourne (Australia), New Haven and San Antonio Branches lead the field in their respective divisions in the AES's Annual Branch Membership Expansion Competition.

Meantime, the Society's aggregate membership, in all classifications including Sustaining Memberships, stands at a record 7602 members as of December 1, 1958 compared with the 7568-member total (corrected) as of December 1, 1957.

An award of $50 is presented yearly by the Society at the Annual Convention to those Branches in three divisions achieving the greatest membership expansion during the twelve-month period commencing April 1. At the current eight-month point, the five leaders in the AES's respective divisions are:

BRANCH MEMBERSHIP COMPETITION

Branch	Members April 1, 1958	New Members	Net Change Membership	Per Cent Change
First Division (126 Members and Over)				
1. Melbourne	162	9	+10.	+ 6.2
2. Chicago	429	22	+17.5	+ 4.1
3. Newark	343	25	+13.	+ 3.8
4. Philadelphia	245	11	+ 8.5	+ 3.5
5. Toronto	182	8	+ 5.	+ 2.7
Second Division (70-125 Members)				
1. New Haven	103	11	+12	+11.7
2. Baltimore-Washington	97	9	+ 8.5	+ 8.8
3. Southeastern	87	11	+ 6.5	+ 7.5
4. Indianapolis	121	11	+ 7	+ 5.8
5. Rockford	80	6	+ 4	+ 5
Third Division (10-69 Members)				
1. San Antonio	12	1	+ 1	+ 8.3
2. British Columbia	37	8	+ 3	+ 8.1
3. Blue Ridge	26	2	+ 1.5	+ 5.8
4. Seattle-Puget Sound	35	1	+ 2	+ 5.7
5. Springfield	68	4	+ 3	+ 4.4

Includes all membership changes, including elections, reinstatements, resignations, suspensions, etc.

SUPREME SOCIETY TO NAME CONVENTION SITES SIX YEARS AHEAD, EFFECTIVE IN 1959

Becoming effective in 1959 by reason of policy change effected by the Supreme Society, AES's summit governing council, at its Annual Meeting held in Cincinnati last May, is the selection by that body of Annual Convention site six years in advance instead of four as heretofore.

At its Detroit Annual Meeting to be held June 18, 1959, therefore, the Supreme Society will choose the 1964 and 1965 Annual Convention locales from among documented Branch invitations formally and officially brought to that meeting for Supreme Society consideration and action.

After the Golden Jubilee Convention and Industrial Finishing Exposition to be held in Detroit, June 15–19, 1959, AES travels to Los Angeles in 1960 for its first Annual Convention west of the Rockies. The following year, 1961, it will convene in Boston—in Milwaukee in 1962—in Atlantic City in 1963. None of these will have a concurrent Industrial Finishing Exposition.

At its June 18, 1959 meeting, the Supreme Society will also select site of the Seventh Interim Meeting to be held in early winter 1960. It will make its choice from among documented invitations from Branches interested in hosting such an Interim Meeting of the Society's governing council.

AES NEWS

DETROIT CHRISTMAS EVENT A GOLDEN JUBILEE HIT

Against a GOLDEN JUBILEE background, including prominent display of the Jubilee's flags, the Detroit Branch conducted a successful two-day Anniversary function at the Statler-Hilton Hotel of that city, December 5–6, 1958.

Launched by a Friday evening Educational Session titled "National Officers' Night" that included John P. Nichols discussing "AES at its Half-Century Milepost" and Dr. A. Kenneth Graham presenting his able technical paper, "Electroplating: Yesterday, Today, Tomorrow," with discussion thereof led by Donald M. Bigge, Detroit's two-day Jubilee affair was concluded Saturday evening by a memorable banquet, floor show and dance, with attractive jewel cases gifted to the ladies.

A hit of that Saturday evening was the pre-banquet reception jointly sponsored by a number of industrial companies. Another hit was their common hospitality room after the floor show.

National President Herberth E. Head presided at Friday evening's "National Officers' Night" Educational Session as Technical Chairman. Branch President Manuel E. Ben opened and closed the meeting. Other national officers present were First Vice President R. D. Wysong; Second Vice President W. A. Wesley; Third Vice President C. G. Borlet and Past President F. T. Eddy.

Photograph Courtesy Andy Catchmark, Chrysler Corporation

AES's BRANCHES TO RECEIVE FREE BRANCH EXHIBIT SPACE

Because of the overwhelming disinterest shown by AES's 58 polled Branches in exhibiting during an Exposition year, no formal Branch exhibit program has been created by the Executive Board for the AES's Industrial Finishing Exposition to be held in Detroit, Michigan, June 15–19, 1959 concurrently with the GOLDEN JUBILEE CONVENTION—nor, consequently, will any Branch exhibit prizes be awarded. As an accommodation, however, to those few Branches that expressed themselves in the Board's poll as desiring to exhibit, the Board has arranged for such Branches to be given free exhibit space at the Exposition upon prompt, direct written request made by them to AES Exposition Chairman Howard J. McAleer, President, Formax Manufacturing Company, 3171 Bellevue, Detroit 7. Such exhibits must be educational as to electroplating, metal finishing and organic coating, not commercial in any way. The foregoing was one of many policy decisions reached by the Board at its Detroit meeting, December 6. Left to right above: Messrs. Nichols, Wysong, Eddy, Head, Wesley and Borlet.

SUPPLEMENTARY LIST OF EXHIBITORS 1959 INDUSTRIAL FINISHING EXPOSITION

(SINCE LIST PUBLISHED IN SEPTEMBER AND NOVEMBER 1958 ISSUES OF PLATING MAGAZINE)

American Air Filter Company, Inc.
The Carborundum Co.
Clementina, Ltd.
Clifford-Rockwell Co.
E. I. duPont de Nemours & Co.
Eaton Chemical & Dyestuff Co.
Finish Engineering Co., Inc.
Industrial Instruments, Inc.
R. W. Legler Plating Works
The McGean Chemical Co.
Minnesota Mining & Mfg. Co.
Nordson Corp.
Phillips Mfg. Co., Inc.
Pockrandt, Inc.
Solventol Chemical Products, Inc.
Techline Division of Wheelabrator Corp.
Technic, Inc.
Tranter Mfg., Inc.
Turco Products, Inc.
Universal Tumbling Supply Co.

(AS OF NOVEMBER 20, 1958)

CREDENTIALS COMMITTEE HAS ACCREDITED SOCIETY'S 1958-1959 GOVERNORS

The Credentials Committee recently accredited the 1958–1959 Branch Delegates/Alternates of the AES's 58 chartered Branches and to each of the Branch members composing these 58 delegations making up the Society's summit government, National Headquarters has now issued credential cards, together with Delegates Manuals for each new Delegate.

As specified by the AES Bylaws, the tenure of each such 1958–1959 Delegate comprising the Supreme Society, AES's highest governing body, extends from the first Branch meeting following the Cincinnati Annual Meeting of the Supreme Society (May 22, 1958) through the first Branch meeting following the Supreme Society's Annual Meeting to be held in Detroit, June 18, 1959—or until their respective successors are duly elected.

The prompt accreditation of these 1958–1959 delegations has permitted the work of the Supreme Society to speed forward, including enabling National President Herberth E. Head to issue the official Notice of Interim Meeting, on schedule, to all 1958–1959 Delegates.

Past President Cleveland F. Nixon (Detroit Branch) heads the 1958–1959 Credentials Committee whose personnel also includes Past Presidents George J. Wagner (Newark Branch) and George P. Swift (Boston Branch).

R. F. Ledford

S. P. Gary

R. S. Modjeska

CHICAGO BRANCH GALA TO BRIGHTEN GOLDEN JUBILEE IN NATION'S MIDWAY

AES's Fiftieth Anniversary will be auspiciously celebrated in Chicago, the nation's famed Midway, with a gala 47th Educational Session and Banquet of that historic Branch at the Conrad-Hilton Hotel, Saturday, January 31, 1959.

Bright feature of the Educational Session will be the paper to be presented by Simon P. Gary, Associate Director, Scientific Control Laboratories, Inc., titled "Fifty Years of Plating Progress". Dedicated to the AES's GOLDEN JUBILEE, this paper depicts the history of the plating industry—its beginning, its growth and its future role in our growing industries.

A graduate in Chemical Engineering of the Rose Polytechnic Institute, Mr. Gary was a Chemical Engineer of the General Motors Corporation, then Plant Manager of the Grunwald Plating Company, before joining his present Company.

A symposium on Modern Nickel Plating, with Mr. Gary as moderator, will be a second bright spot of Chicago's GOLDEN JUBILEE Educational Sessions. Participants will include Clarence H. Sample of the International Nickel Company; Dr. M. M. Beckwith of the Harshaw Chemical Company; Myron B. Diggin of Hanson-Van Winkle-Munning Company and Dr. R. B. Saltonstall of Udylite.

Midway's GOLDEN JUBILEE observance will be climaxed that Saturday evening by the type of banquet, floor show and dance for which the Chicago Branch is celebrated throughout the Society.

National Officers who will be present include National President Herberth E. Head; First Vice President Ralph D. Wysong and National Executive Secretary John P. Nichols. General Chairman is R. F. Ledford, President of the Chemray Corporation. R. Scott Modjeska is Chicago's President with Paul R. Glab as the Branch's Secretary-Treasurer.

CITY DIGNITARIES TO ATTEND GRAND RAPIDS' JUBILEE CELEBRATION

Built around the GOLDEN JUBILEE theme, the Twenty-First Annual Education Session and Dinner-Dance to be held at the Pantlind Hotel, Grand Rapids, Michigan, January 17 will include a Jubilee Luncheon to be attended not only by the Branch and its many expected guests but also by Mayor Stanley J. Davis of that city and other local dignitaries.

Principal luncheon speaker will be AES Third Vice President Chester G. Borlet, a Past President of that Branch and one of its tireless stalwarts. He is Technical Director of the Grand Rapids Brass Company.

National President Herberth E. Head will be among the several other AES National Officers scheduled to be present at Grand Rapids' impressive AES FIFTIETH ANNIVERSARY event.

Chartered in 1918 and itself currently observing its Fortieth Anniversary, the Branch's current distinctions include co-sponsorship with AES and the Metal & Thermit Company, of the John J. Hanney Memorial Award for the best paper on copper plating published during the fiscal year in Society publications.

GOLDEN JUBILEE ISSUE
PLATING MAGAZINE
JUNE 1959
WILL INCLUDE ITS
"KALEIDOSCOPE OF AES's
FIRST HALF CENTURY

PROGRAM
SIXTH INTERIM MEETING, SUPREME SOCIETY
and
DIXIE "GOLDEN JUBILEE" REGIONAL MEETING
AMERICAN ELECTROPLATERS' SOCIETY
DINKLER-PLAZA HOTEL, ATLANTA, GA.
FEBRUARY 13-14, 1959

FEBRUARY 12

8:00 p.m.—Registration, Dixie Regional Group, Hotel Lobby

FEBRUARY 13

8:00 a.m.—Registration, Dixie Regional Group, Hotel Lobby
9:00 a.m.—Executive Board Meeting, Executive Secretary's Suite (All Day)
9:00 a.m.—Plant Tour, Dixie Regional Group—(Lockheed Aircraft Corporation, Georgia Division)
1:30 p.m.—Opening Session, Dixie Regional Meeting, Plaza B Room
2:00 p.m.—Educational Session "A", Dixie Regional Group, Plaza B Room
8:00 p.m.—Joint Meeting, AES Executive Board and Board of Trustees, Metal Finishing Suppliers' Association, Executive Secretary's Suite

FEBRUARY 14

8:00 a.m.—Registration, Dixie Regional Group, Hotel Lobby
8:00 a.m.—Registration, AES Delegates/Alternates, Plaza B
9:00 a.m.—Educational Session "B", Dixie Regional Group, Rainbow Roof
10:00 a.m.—Sixth Interim Meeting, AES Supreme Society, Plaza B
12:00 noon—Luncheon, Delegates/Alternates, Sky Room
1:00 p.m.—Sixth Interim Meeting, AES Supreme Society, Plaza B
2:00 p.m.—Annual Meeting, Dixie Regional Delegates, Mirror Room
6:30 p.m.—Reception, Dixie Regional Group, Sky Room
7:30 p.m.—Golden Jubilee Banquet, Dixie Regional Group Rainbow Roof

FEBRUARY 15

9:00 a.m.—Executive Board Meeting, Executive Secretary's Suite.

HOST: AES
DIXIE REGIONAL GROUP

INTERIM MEETING REPORTER

DINKLER-PLAZA HOTEL
ATLANTA, GEORGIA
FEBRUARY 14, 1959

AES GOVERNORS TO ASSEMBLE IN DIXIE FOR GOLDEN JUBILEE MEETING

Accredited Delegates and Alternates composing the Supreme Society, the American Electroplaters' Society's (AES) governing council, will converge upon Atlanta, Georgia, from many sections of the United States and Canada to attend the SIXTH INTERIM MEETING of that body that will be held at the Dinkler-Plaza Hotel, Saturday, February 14, 1959. Now required to be held annually by AES's amended Bylaws, such midwinter interim meetings of the Supreme Society were initiated in 1951. The five held to date were conducted in Philadelphia (1951); Columbus (1953); Toronto (1954); Pittsburgh (1957) and Indianapolis (1958).

The Interim Meeting has been coupled with the First Regional Educational Session and Banquet of AES's dynamic Dixie Regional Group so as to form a two-day element of AES's GOLDEN JUBILEE observance. The Dixie Group, comprised of the Blue Ridge, Miami and Southeastern Branches, is the Host group and the latter Branch (Southeastern) is the Host Branch spearheading meeting arrangements. The resultant two-day affair, including the February 13 program of Dixie Group events, should make this two-day AES visit to Dixie, a mid-winter feature of the Society's FIFTIETH ANNIVERSARY observance.

Friday forenoon, February 13, will spotlight the Dixie Group's conducted tour of the famed Georgia Division plant of the Lockheed Aircraft Corporation—followed by the Opening Session, then by Educational Session "A". Meantime, AES's Executive Board will engage in a full-day's meeting—followed that evening by an informal joint meeting with the Board of Trustees of the Metal Finishing Suppliers' Association.

While the Supreme Society itself will be occupied with its full-day SIXTH INTERIM MEETING on Saturday, February 14, recessing only at mid-day for luncheon, the Dixie Group's large expected attendance of non-Delegates will enjoy Educational Session "B". Delegates and non-Delegates will then come together again to enjoy the Dixie Group's Reception at 6:30 p.m., to be followed by the gala GOLDEN JUBILEE banquet, program, floor show and dance that will conclude the impressive two-day GOLDEN JUBILEE affair in the realm of King Cotton.

Leadership of the Branches composing the Dixie Group includes T. R. Boggess, President, Blue Ridge Branch; Marmaduke H. Dent, head of the Miami Branch and Claude J. Nalley, Branch President of Southeastern. Myron M. Randman is the two-day event's General Chairman, with AES Past President Frederick Fulforth as Coordinator.

Southeastern Branch stalwarts that, for months, have been doing yeoman duty so as to make this Dixie event successful include H. R. Stogner Sr. (Secretary-Treasurer); Mrs. Jerita D. Wilson (Educational Sessions); William F. Kelly (Publicity Chairman); Justus U. Belville (Entertainment Chairman); John E. Varner (Program); Richard R. Russell (Registration), and Herbert Hatley (Hotel Chairman). The Ladies Program Committee teams the resourceful ladies of Southeastern, including Mrs. Myron M. Randman; Mrs. Charles I. Lewis and Mrs. William F. Kelly. Also on the firing line is Southeastern's First Vice President Bob M. Taylor, and the Branch's Board of Managers comprised of Branch Past Presidents George W. Taylor, Clyde Stovall and Charles I. Lewis.

Mrs. Florence K. Marquardt, veteran of 22 AES Annual Meetings and 5 Interim Meetings, will serve, as usual, as official INTERIM MEETING reporter. The published proceedings will be issued to all Branches well in advance of the Annual Meeting of the Supreme Society that will be held in Detroit, Thursday, June 18, 1959.

T. R. Boggess

M. H. Dent

C. J. Nalley

M. M. Randmann

AGENDA

SIXTH INTERIM MEETING AES SUPREME SOCIETY

DINKLER-PLAZA HOTEL
ATLANTA, GEORGIA
FEBRUARY 14, 1959

1. **Roll Call**
2. **Welcome by the Dixie Regional Group**
3. **Welcome by the National President**
4. **Opening of the Session as an Interim Meeting**
   Purpose of the meeting as a sounding board on matters for subsequent consideration and action by the Supreme Society at its Annual Meeting in Detroit, June 18, 1959
5. **Progress and Status Reports:**
   Financial by President
   Educational by First Vice President
   Membership by Second Vice President
   Constitutional/Bylaw Amendments by Third Vice President
   Honorary, Merit and Achievement Awards by Past President
   Headquarters and Publishing by National Executive Secretary
   GOLDEN JUBILEE:
   a) Convention by General Chairman
   b) Exposition by Exposition Chairman
   c) International Conference by International Council Chairman
   d) Year-long observance by Executive Secretary
6. **Preliminary Reports:**
   a) Appraisal Committee as to the Need for a Long-Range Planning Committee
   b) Appraisal Committee as to the Need for a Convention Planning Committee
7. **Comments and Questions from the Floor**
   a) Membership Promotion (Membership Committee Chairman, Discussion Leader)
   b) Educational Program including Organic Finishing (Education Committee Chairman, Discussion Leader)
   c) Publications Program (Publications Committee Chairman, Discussion Leader)
   d) Research Program (Research Committee Chairman, Discussion Leader)
8. **Consideration of AES's Per-Capita Tax Structure**
9. **New Business Brought for Discussion by Delegates**
10. **Announcement of Candidates for Third Vice Presidency**
11. **Adjournment**

DIXIE REGIONAL GROUP TO VISIT LOCKHEED PLANT

A Plant Tour of the Lockheed Aircraft Corporation's Georgia Division will be a feature of the Dixie "GOLDEN JUBILEE" Meetings, February 13–14, 1959. With the visiting party departing by bus for Marietta from the Dinkler-Plaza Hotel at 9 a.m. February 13, it will view as much as possible of this world's largest aircraft plant.

Employing 76 acres of production floor space under one roof, its main manufacturing and assembly building has the capacity to deliver simultaneously to the USAF, five different types of large multi-engine aircraft from five different assembly lines.

The plant has the South's largest installation of precision machines. It boasts, too, of one of the most modern aircraft radar-electronics laboratories in the nation.

TENTATIVE PROGRAM

GOLDEN JUBILEE CONVENTION
AMERICAN ELECTROPLATERS' SOCIETY, INC.

HOTEL STATLER-HILTON, DETROIT, MICHIGAN
JUNE 15-19, 1959

This is a TENTATIVE PROGRAM as of December 1, 1958. Additions and modifications will be made monthly until finalized

SUNDAY, JUNE 14

9:00 a.m.	Executive Board Meeting (All Day)	Hq. Room (Parlor B)
1:00–8:00 p.m.	Registration	Foyer
3:00–5:00 p.m.	Ladies Tea	English Room
4:00 p.m.	Credentials Committee Meeting	Parlor B
4:00 p.m.	AES Scientific Achievement Award Committee Meeting	Parlor F
8:00 p.m.	Golden Jubilee Get-Together Party	Grand Ballroom

MONDAY, JUNE 15

9:00 a.m.–5:00 p.m.	Registration	Foyer
10:00 a.m.	Grand Opening, Golden Jubilee Convention	Grand Ballroom
11:00 a.m.	Business Meeting, Supreme Society	Grand Ballroom
12:00 noon	Branch Secretaries' Luncheon	English Room
12:00 noon	Speakers' Luncheon	Parlor E
2:00 p.m.	Opening Educational Session A, Fifth International Conference on Electrodeposition and Metal Finishing	Grand Ballroom
2:30 p.m.	Editorial Board Meeting	Parlor E
4:30 p.m.	Order of Past Presidents, Business Meeting	(To be announced)
6:30 p.m.	Past Presidents' Dinner	(To be announced)
7:00–9:00 p.m.	Registration	Foyer
9:00 p.m.	AES Golden Jubilee Open House (Sponsored by Metal Finishing Suppliers Association)	Sheraton-Cadillac Ballroom

TUESDAY, JUNE 16

8:00 a.m.	Research Committee Breakfast	Parlor F
8:00 a.m.	Speakers' Breakfast	(To be announced)
9:00 a.m.–12:00 noon	Registration	Foyer
9:00 a.m.	Educational Session B, International Conference	Grand Ballroom
9:00 a.m.	Educational Session C, International Conference	Michigan Room
9:00 a.m.	Research Committee Meeting	Parlor F
9:00 a.m.	Educational Committee Meeting	Parlor E
12:00 noon	Branch Librarians' and Educational Committee Luncheon	English Room
12:00 noon	Speakers' Luncheon	(To be announced)
2:00 p.m.	Research Committee Meeting	Parlor F
2:30 p.m.	Educational Session D, International Conference	Artillery Armory

WEDNESDAY, JUNE 17

8:00 a.m.	Membership Committee Breakfast	Parlor F
8:00 a.m.	Speakers' Breakfast	Parlor E
9:00 a.m.–12:00 noon	Registration	Foyer
9:00 a.m.	Public Relations Committee Meeting	English Room
9:00 a.m.	Membership Committee Meeting	Parlor F
9:00 a.m.	Educational Session E, International Conference	Grand Ballroom
9:00 a.m.	Educational Session F, International Conference	Michigan Room
4:00 p.m.	Golden Jubilee Outing	Artillery Armory Grounds

THURSDAY, JUNE 18

8:00 a.m.	Speakers' Breakfast	Parlor F
9:00 a.m.–12:00 noon	Registration	Foyer
9:00 a.m.	Business Meeting, Supreme Society	Michigan Room
9:00 a.m.	Educational Session G, International Conference	Grand Ballroom
12:00 noon	Speakers' Luncheon	Parlor F
2:00 p.m.	Business Meeting, Supreme Society	Michigan Room
2:30 p.m.	Educational Session H, International Conference	Grand Ballroom
7:00 p.m.	Golden Jubilee Banquet, Floor Show and Dance	Statler-Hilton

FRIDAY, JUNE 19

8:00 a.m.	President's Breakfast (National Officers and Wives)	President's Suite
8:00 a.m.	Speakers' Breakfast	Parlor F
9:00 a.m.	Executive Board Meeting	Parlor B
9:00 a.m.	Educational Session I, International Conference	Michigan Room
9:00 a.m.	Educational Session J, International Conference	Grand Ballroom
12:00 noon	Speakers' Luncheon	Parlor F
2:30 p.m.	Educational Session K, International Conference	Artillery Armory

TO THE LADIES

We are getting ready to entertain you. Plans have been shaping up for several months and now we feel that the events decided upon for your pleasure, will delight you.

At the gateway to Michigan's beautiful Water Wonderland, only minutes from dynamic Detroit, lies a full-scale panorama of American life as our forefathers knew it. This is Greenfield Village. In this delightful outdoor museum, you will soon forget the modern tempo, as you ride along the shaded lanes, stopping to see the early shops, stores, schools and homes brought together from all sections of America.

Mrs. George A. Pillsbury

You will be thrilled to visit Thomas Edison's laboratory where the electric lamp was born, or pause in the bicycle shop where the Wright Brothers created the first airplane, or walk the oaken floors of a courthouse where Lincoln practiced law. You can pose for your tin-type taken with a century old camera in America's last active tintype studio. Unlimited opportunities for camera enthusiasts are provided by settlings such as a 17th century windmill, an old blacksmith shop or standing beside a stage coach you will see the world's greatest collection of restored antique automobiles. Also the art of early candlemaking.

You will be impressed by the imposing building at the entrance of the museum, a true replica of Independence Hall, symbol of American Liberty. Nowhere else in America will you find the history and traditions of our nation more colorfully or more authentically preserved.

Following this, you will enjoy luncheon at the Inn, with its exquisite Colonial charm, set in the center of its 28 acres. You are going sightseeing along Detroit's new waterfront, then luncheon at the spacious Detroit Yacht Club, where scores of needle-like boats, with their bright sails and fabulous yachts, shiny and powerful, move into Lake St. Clair.

Another day we will tour the Ford Motor Company. There you will see how a car is made and assembled by the highly efficient method of automation. Following this we will enjoy luncheon on "American Road."

Only in Detroit, will you enjoy a trip and luncheon on the ocean liner "Aquarama." This fabulous ship has been engaged for the day and should prove to be an outstanding highlight of convention week.

Several other functions have been planned for your pleasure, but we have also arranged the program so you can have time to shop visit Canada across the Detroit River, browse around the Art Institute, watch the races, attend a Tiger ballgame and a score of other activities too numerous to mention.

We plan to make this the "best-yet" convention. Nothing is being spared in entertaining you.

We hope that you and your husband will spend your entire vacation in the "Water Wonderland."

Alice E. Pillsbury

(Mrs. Geo. A. Pillsbury)
Ladies Chairman

(This is a tentative program still subject to additions and modifications)

(At Left) DETROIT, ILLUSTRIOUS AES CONVENTION CITY

(Top) Washington Boulevard entrance to the Statler Hilton Hotel. (Next to top) Famous Rouge plant of the Ford Motor Company. More than 1200 acres of factories, foundries, steel mills, paper mill, glass plant, power plants, coke ovens, ships docks and private railroad lines. (Next bottom) Ambassador Bridge over the Detroit River links Detroit and Windsor, Canada. Detroit skyline in background. (Bottom) Detroit's Children's Zoo where animals romp in a Mother Goose setting.

INTERSOCIETY NEWS

PURDUE WASTE CONFERENCE DATES ANNOUNCED

The 14th Purdue Industrial Waste Conference will be held on May 5, 6 and 7, 1959. The meetings will be in the Purdue Memorial Union Building at Purdue University.

There will be approximately 50 papers presented on subjects dealing with industrial wastes and their treatment.

Hotel reservations can be made at the Purdue Union Club, Fowler Hotel, Cedar Crest Hotel and Morris Bryant Hotel, Lafayette, Indiana.

Everyone is welcome. Registration blanks will be mailed upon request to Dr. Don E. Bloodgood, Purdue University, School of Civil Engineering, Lafayette, Indiana.

FOUR APPOINTED TO NAMF BOARD

Three Chicagoans and one Washington metal finishing executive were named to the board of directors of the National Association of Metal Finishers.

Arthur G. Pierdon, president of Art Metal Finishing Co., Inc., Washington, D.C., was appointed to fill the unexpired term of Amos Judd of Baltimore, Md. who resigned recently because of ill health.

Other new members of the board include Robert L. Giesel, Adolph Plating, Inc.; J. William Carlson, Arrow Plating Co.; and William R. Crawford, Chrome-Rite Co., all of Chicago. They were named to fill the unexpired terms of the following interim appointees by the Chicago Electro-Platers' Institute: H. W. Baker, Electro-Galvanizing Co.; L. J. Hay, Plating Service Co. and P. J. Ritzenthaler, Plating Engineering Co.

PLASTICS CONFERENCE TO HAVE 26 TECHNICAL SESSIONS

"The most comprehensive plastics technical program ever presented will attract more than 3000 executives, scientists and engineers to participate in the 15th Annual Technical Conference of the Society of Plastic Engineers," R. Kenneth Gossett, SPE National President predicts. The Conference will be held at the Hotel Commodore, New York City, January 27–30, 1959. "Anyone interested in the technical aspects of plastics is invited to attend," Mr. Gossett emphasized, pointing out that the Conference is not restricted to SPE members and that students are being encouraged to participate.

The 108 papers to be presented in 26 technical sessions will cover every segment of the scientific and engineering field of the plastics industry. The new developments in materials, products, processes and equipment to be reported represent millions of dollars of research and development investment. Committees of experts in each technical specialty assisted the program committee in selecting the best of many papers offered for the program by SPE members and the plastics industry.

Among speakers who will carry out the Conference theme "Worldwide Advances in Plastics" are Professor H. V. Kargin, vice president, U.S.S.R. Academy of Sciences, and Professor Guilio Natta, Polytechnic Institute of Milan, Italy.

Professor Kargin will address a luncheon meeting, and Professor Natta will participate in the opening session on "stereo-specific polymers" of which Professor Herman F. Mark of the Polytechnic Institute of Brooklyn will be moderator. Frank C. McGrew, E. I. duPont de Nemours & Co., Inc.; Dr. A. A. Harban, E. Field and H. N. Friedlander, Standard Oil Co. (Ind.); and J. N. Short, C. Kraus, R. P. Zelinski, and F. E. Naylor will also contribute papers to this session.

Space applications of reinforced plastics —their role in re-entry ablation and their application to rocket motors—feature two sessions devoted to this growing type of plastics.

A session on new materials will feature "ABS polymers", "Elkinite resins", and "reverse polyesters".

Topics of other sessions include blow molding, injection molding, compression molding, extrusion, thermoforming, high-temperature electrical insulation, aesthetic aspects, vinyls, mold design, printed circuits, plastics in buildings, test methods, cellular plastics and foams, epoxy resins, packaging, adhesives, permanence properties, and the responsibility of the professional man to education.

A banquet on Thursday, January 29, and two general luncheons complete the program.

Advance registration can be made by writing to The Society of Plastics Engineers, 65 Prospect Street, Stamford, Conn.

CORROSION SHOW TO FEATURE METALS, PLASTICS

Seventy-nine companies have reserved 103 booths at the 1959 Corrosion Show to be held March 17–19 at the Sherman Hotel, Chicago. The show will be held concurrently with the 15th Annual Conference of the National Association of Corrosion Engineers.

Among the scheduled exhibitors are companies that will display high performance alloy materials, heat resisting non-metallics, all kinds of plastic materials and equipment, coatings and linings, instruments for measuring corrosion processes and making electrical surveys, ceramic and metal ceramic combinations; numerous kinds of engineering services and a wide variety of metal and plastic equipment for industrial uses.

ASTM COMMITTEE WEEK TO BE HELD AT PITTSBURGH

Approximately 1500 to 2000 members, committee members, and visitors will meet at the American Society for Testing Materials Committee Week meeting in Pittsburgh at the Penn-Sheraton Hotel, February 2–6, 1959. About 30 of the society's main technical committees will hold some 350 meetings of subcommittees and working groups to advance toward completion the year's committee work in anticipation of preparing reports for presentation to the society at the Annual Meeting at Atlantic City next June.

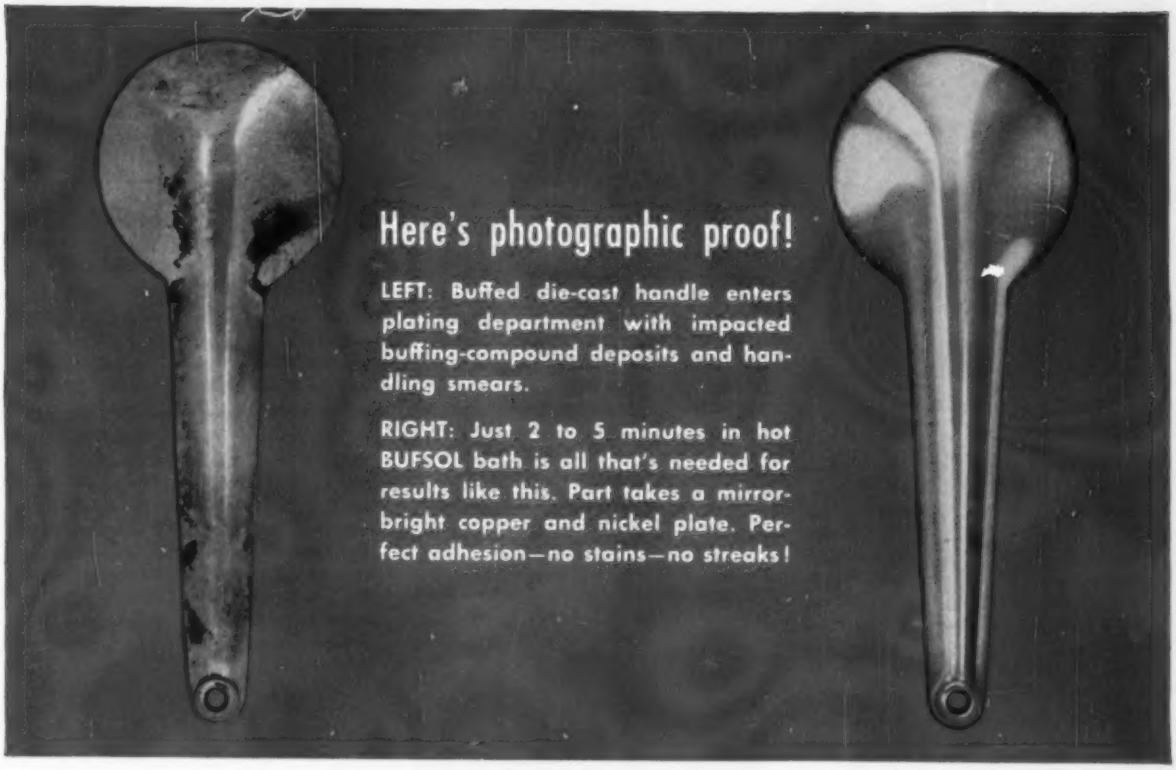
John C. Warner, president, Carnegie Institute of Technology and technical consultant to the U. S. delegation to the Second U. N. International Conference on the Peaceful Uses of Atomic Energy at Geneva, Switzerland, will be the guest of honor and speaker at the Committee Week dinner on Wednesday, February 4.

On Tuesday, February 3, a special luncheon is being planned to feature one of Pittsburgh's outstanding industries. The industry concerned will be announced later.

AMERICAN ELECTROPLATERS' SOCIETY
GOLDEN JUBILEE
CONVENTION
AND
INDUSTRIAL FINISHING
EXPOSITION
AND
FIFTH INTERNATIONAL CONFERENCE
ON
ELECTRODEPOSITION & METAL FINISHING
DETROIT, MICHIGAN
JUNE 15-19, 1959

New Wyandotte **BUFSOL**

REMOVES STUBBORN BUFFING COMPOUNDS WITHOUT SOLVENTS


Here's photographic proof!
LEFT: Buffed die-cast handle enters plating department with impacted buffing-compound deposits and handling smears.
RIGHT: Just 2 to 5 minutes in hot BUFSOL bath is all that's needed for results like this. Part takes a mirror-bright copper and nickel plate. Perfect adhesion—no stains—no streaks!

...adaptable to every plating cycle

New BUFSOL is fast, safe, effective . . . the perfect solution to your plating department's No. 1 headache—buffing-compound removal. Check these performance features:

Highly effective: BUFSOL assures bright, stain-free, adherent electrodeposits—removes most buffing compounds, tripoli, and rouges—rapidly removes water-dispersible-type compounds.

Concentrated: BUFSOL solutions have long life even when loaded with buffing compound. BUFSOL is completely miscible in water, is used as a dilute solution.

No plating bath contamination: BUFSOL, a liquid detergent concentrate, rinses easily from recesses and damaged rack coatings. Can't interfere with electrocleaner performance!

Safe on metals: BUFSOL will not etch, darken, or attack zinc-base die castings, copper, brass, steel, or aluminum when used at recommended concentrations and temperatures.

Essentially odorless: BUFSOL produces no obnoxious fumes or odors, requires no special ventilation.

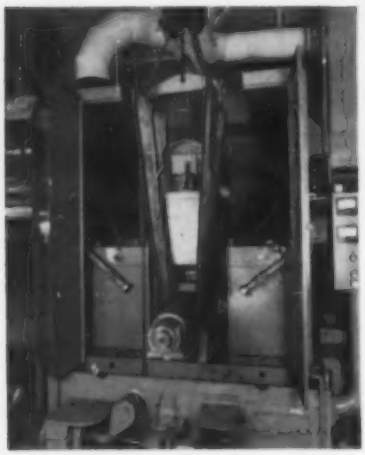
For full information on new BUFSOL, and other Wyandotte metal-cleaning products, call in a skilled Wyandotte representative today! *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.*

Wyandotte CHEMICALS

J. B. FORD DIVISION

THE BEST IN CHEMICAL PRODUCTS FOR METAL FINISHING

INDUSTRY NEWS



HEAVY CONTACT ROLLS HANDLED BY CANVAS SLING

A simple method of handling heavy machine rolls, developed by abrasives engineers of Behr-Manning Co. in Troy, N. Y., is said not only to reduce man-hours by at least 80 per cent, but also cuts injury hazard to the vanishing point. Developed for removing worn contact or billy rolls up to 60 in. in length from large grinders which use coated abrasive belts, the method is widely applicable in many plants.

Such rolls often weigh from 700 to 1000 lb; this weight, plus their awkward length and the necessity of working in close quarters, has made the change-over an awkward and difficult job.

The improved method starts with cutting and hinging a section in the top of the machine housing, in order to allow access for the sling. Next, mount a monorail and a one-ton hoist above and along the center line of the machine, extending the monorail six feet out from the machine housing.

Make a steel yoke or spreader bar an inch or two wider than the idler roll diameter, and build a sling of heavy-duty canvas. Hook each end to the steel yoke to form a cradle for the heavy roll. This sling should be reinforced with webbing sewn over steel bars at each end.

With the sling in place under the roll, disconnect the roll, hoist slightly to clear the ends, then pull it forward out of the machine and lower it to a dolly—preferably low to prevent tipping. Such a sling cradles the roll safely, preventing damage to rubber or other surfaces.

MacDERMID SALES ACQUIRES VARI-FINISH CORP.

Acquisition of the Vari-Finish Corp. of Wallingford, Conn., has been announced by the MacDermid Sales & Equipment Corp.

W. D. MacDermid, president of the Bristol concern, said the operations, equipment and key personnel of Vari-Finish are being moved to The W. D. MacDermid Chemical Co.'s Plymouth location where they will be incorporated in the firm's expanded tumbling and burnishing department.

E. J. Sullivan, former president of Vari-Finish, has been appointed manager of the expanded department.

Mr. Sullivan is a veteran of 18 years' experience in the metals finishing field. Before his association with Vari-Finish he had been employed by the Roto-Finish Co., then of Sturgis, Michigan, and the Almco Supersheen Products Corp. of Albert Lee, Minnesota.

Mr. MacDermid also announced that construction is under way on a substantial addition to the W. D. MacDermid Chemical Co.'s Plant in Plymouth.

Construction on the new addition is expected to be completed early in 1959.

PLASTISOL COATINGS NOW APPLIED BY H-VW-M

Hanson-Van Winkle-Munning Co. is now applying plastisol coatings to plating equipment it manufactures.

In addition to coating its equipment, the company is also taking orders for custom coating of plating equipment. The new facilities enable H-VW-M to perform related operations, including sandblasting, priming, preparatory baking, coating by both spray and dip processes, and final baking after application of the plastisol.

Tanks, racks, exhaust hoods and duct work will be treated, as well as auxiliary equipment such as cathode rod insulators, screens used for protection of air agitation equipment, diaphragms, pipe and flange pipe fittings, fans, and stirrers.

STEVENS DEVISES PLANT DEMONSTRATION IDEA

As part of a stepped-up sales and merchandising program, Frederic B. Stevens, Inc. has devised a means of taking one of its machines right to customer's plants and demonstrating it there.

The machine is "Little Steve," a standard, ten-foot-long automatic plating machine. Mounted on a 12-foot, car-drawn trailer, "Little Steve" is completely wired and ready for operation. It comes equipped with a 150-foot extension cord that permits it to be operated anywhere, indoors or out. On one of its first trips it went from Detroit to Battle Creek for demonstration.

ROHCO HAS NEW DETROIT WAREHOUSE

R. O. Hull & Co., Inc., recently opened a Detroit sales office and service laboratory at 3136 Hilton Road, Ferndale, Michigan, to supply Detroit, Toledo and the southeastern Michigan area.

The new district office offers analytical laboratory and warehouse facilities to handle Rohco plating specialties, and will also carry a complete stock of Enthone and related plating chemical supplies.

Herbert Geduld, former Detroit representative, is district manager. Joe Manzella, formerly with the Peninsular Laboratory, has been appointed technical representative. Glenn Berger, formerly with the Rohco Cleveland laboratory, is analytical chemist.

ENTHONE ABSORBS EQUIPMENT SUBSIDIARY

Enthone, Inc. of New Haven, Connecticut, a subsidiary of American Smelting and Refining Co., has taken over and will continue in its own name the business of its wholly owned equipment subsidiary, Comco, Inc. Comco's manufacturing facilities will be integrated with Enthone's

and operate as the equipment department of Enthone. J. J. Martin Jr., general manager of Comco, has been appointed general manager of the new Enthone Equipment department.

This change, according to Dr. Walter R. Meyer, Enthone president, will facilitate expansion of the company's equipment business, previously confined to the northeastern U. S. area, to the entire country. Comco, Inc. was founded in 1946 and has specialized in the engineering, design and manufacture of metal finishing equipment and the fabrication of corrosion resistant plastic tanks and exhaust casings for the chemical process industries. The firm has also been active in the design and installation of complete treatment facilities for plating room wastes.

All of these activities will be expanded under the new setup, explained Dr. Meyer, and increased emphasis will be placed on sales of completely automated plating installations designed around the Abbey Process automation system.

FACER-TRIMMER ASSURES BUFF BALANCE AND CONCENTRICITY

An important element in the development program of American Buff Co., Chicago, is the research and engineering department which has created many new buff designs and improvements serving the metal finishing industry. Research specialists there have shown that a single ounce inbalance on a 14-in. buff running at 1800 rpm exerts 40 extra pounds of centrifugal force. To produce positive accuracy and balance in its buffs for use in high-speed metal-finishing operations, American Buff has designed and built its own precision facer-trimmer machine, capable of absolute accuracy in buff balance and concentricity.

RAYBESTOS-MANHATTAN NEW SAN FRANCISCO WAREHOUSE

Raybestos-Manhattan, Inc. announces the moving of its San Francisco district warehouse and offices from 131 Mission Street to new and larger quarters at 168 Beacon Street, South San Francisco, Calif.

The larger facilities were needed to provide better service for customers of the several divisions, Manhattan Rubber, Raybestos, Packing, Asbestos Textile and Plastic Products, now represented there.

FEDERATED ST. LOUIS OFFICE IN NEW HEADQUARTERS

The St. Louis Sales Office of the Federated Metals Division of American Smelting and Refining Co., has moved from its former location at 4041 Park Avenue in St. Louis to Federated's new plant at Alton, Illinois.

The new office will continue to be under the direction of C. R. Kenner, district manager. The address at Alton is P. O. Box 268.

A low priced ...vacuum type filter

Designed for use as an individual filter for multiple tanks in large shops. Ideal as a quality, low cost filter for small plating shops.

Capacity 500 G.P.H.
Price $395.00
Model PV-20-1000 G.P.H.
Price $850.00

A new simplified construction principle makes this low price possible.

The Sparkler Plater's-Pal will handle acid and cyanide solutions (except chromic acid and high chloride nickel).

The Sparkler PLATER'S-PAL will filter

Arsenic Cyanide
Brass Cyanide
Bronze Cyanide
Cadmium Cyanide
Copper Cyanide
Neutralizers (Cyanide & Borax)
Tin Stannite
White Brass Alloy
Zinc Cyanide
Acid Copper Sulphate
Acid Zinc
Black Nickel Acid
Cadmium Fluoborate
Copper Fluoborate
Lead Sodium Fluoborate
Lead Sulfamate
Nickel
Palladium
Tin Fluoborate
Tin Nickel Alloys

Sparkler plating filters are used in some of the largest plating plants in the world.

SPARKLER
PLATER'S-PAL
FILTER

★ Only clean solution flows through the pump—no excessive pump wear.

★ Visual inspection of all parts including filter plates possible without dismantling filter.

★ All solution reclaimed.

★ Completely enclosed but with easy access to operating parts.

★ Cover locks and unlocks with one quick opening connection—no cover bolts, no complicated sealing devices.

★ Can be cleaned and back in operation in 10 minutes.

★ Positive uniform quality of filtration at all times.

Sold only through plating suppliers

SPARKLER FILTERS

Sparkler Manufacturing Co.
Mundelein, Illinois

Sparkler International Ltd., with plants in Canada, Holland, Italy & Australia.

Filtration engineering and manufacturing exclusively for over 25 years.

USE READER SERVICE CARD; INDICATE A 124.

Barrel Nickel Plating

●

A modern trend is to secure more production from fewer man hours. Since equipment and manpower are usually well balanced the only way to get more production is to reduce time lost through trouble.

●

In barrel nickel plating a major loss is in rejects due to dark plate, flaking and peeling. These troubles are frequently related. Copper in the nickel plating solution can cause trouble with dark plate and also with peeling. The only real remedy is to dummy plate for whatever length of time is necessary to remove the copper. Naturally any plater wants to eliminate the source of his troubles. A major source of copper contamination is nickel chloride. This can be overcome by using magnesium chloride. This material is available at reasonable prices in a pure form suitable for adding chloride to nickel solutions without introducing copper or other harmful metals into the solution.

●

When you're selecting materials for your barrel nickel plating care in selection will pay you dividends in trouble free performance. True Brite has always specialized in barrel nickel addition materials and does not merely use a modified still tank material. Our materials are as concentrated as we can reasonably make them. Lower prices per gallon are easy to achieve by merely adding water and many people do. Our formulas are widely copied and we feel we have always been ahead of the parade. We were the first to put nickel addition agents into-non-returnable four gallons cartons. Maybe you're just running a single barrel off in a corner but it's still important to do as well as the best who are using True Brite Nickel Brightener.

TRUE BRITE CHEMICAL PRODUCTS CO.
98 FALLS AVENUE OAKVILLE, CONN.

INDUSTRY NEWS BRIEFS

FEDERAL TRADE RULES SEMINAR

Developments in Gold Electroplating Technology—enabling practical compliance with the new Federal Trade Commission rulings governing the use of the markings: "Gold Electroplate" and the new quality designation "Heavy Gold Electroplate" will be the subject of a seminar-discussion, and continuous demonstration, on Jan. 29, 1959, at the Rhode Island School of Design Auditorium, in Providence.

According to E. C. Rinker, technical director, Precious Metals Division, Sel-Rex Corporation, Nutley, N. J., and chairman of the seminar, a new method of applying gold coatings in a variety of different shades and colors—from flash to extra heavy deposits—directly from the bath will be demonstrated.

Continuous demonstrations from 2 to 6 p.m. at the RISD Auditorium. Cocktails and hors d'oeuvres from 5:30 to 7:30 p.m. at the nearby Sheraton-Biltmore Hotel. Seminar-discussion, followed by demonstrations, starts promptly at 8 p.m. in the auditorium. In addition to Mr. Rinker, group discussion leaders will include Dr. Karl Schumpelt, chief electrochemist, and Al Korbelak, manager, new product development, respectively, of Sel-Rex, sponsors of the program.

LEA-RONAL OBTAINS INJUNCTION AGAINST SMOOTHEX INC.

Lea-Ronal Inc, 139-20 109th Avenue, Jamaica, N. Y. developers of electroplating processes, and its associate company, Elechem Corporation, Jersey City, N. J., have secured an injunction against Smoothex Inc, Cleveland, Ohio, and Platers Research Inc. of New York, N. Y. in a patent infringement suit based on violation of Lea-Ronal's Patent 2,732,336 for bright copper plating.

The decree adjudged the patent to be valid and infringed upon by Smoothex Inc. Smoothex Inc. was enjoined from directly or indirectly manufacturing, using, and selling products coming within the scope of the patent.

As liquidated damages Smoothex Inc. assigned to Lea-Ronal its trademark "Smoothex", together with the associated good will and business. In addition, Smoothex assigned to Elechem Corporation its Patent 2,814,590 relating to bright copper plating.

ACHESON MEMORIALIZED BY UNIVERSITY OF BUFFALO

The University of Buffalo has named its new chemistry building now under construction the "Edward Goodrich Acheson Hall of Chemistry" as a memorial to a distinguished inventor-scientist whose major industrial activities for many years centered at Niagara Falls.

Mr. Acheson's discoveries and researches in electrochemistry and electrometallurgy ranged over a wide field. His invention in 1891 of the diamond-like abrasive for which he coined the trade name "Carborundum" made modern mass industrial production possible.

The Carborundum Co., which Acheson formed in 1891 to manufacture and market silicon carbide, has grown to be one of the giant industries of the country, with an ever broadening group of products, with annual sales of more than $100,000,000, with more than 7000 employes in the United States and Canada, and with 33 plants in 11 countries.

Another Acheson invention that has played a major part in modern industry is chemically pure, man-made graphite.

PATENT ABSTRACTS

DR. D. GARDNER FOULKE
Manager, Electrochemical Development
Hanson-Van Winkle-Munning Co.
Matawan, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

No. 2,848,349, 8/19/58—Flame Spraying—H. Rechter and M. Eisenberg, assignors to Armour Research Foundation, Chicago, Ill.

A method for flame spraying lithium aluminate and zirconia is claimed.

8 claims.

No. 2,848,351, 8/19/58—Nitric Acid Pickling—E. Boller, et al, assignors to USA (AEC).

A uranium article is pickled in 50–70 per cent HNO_3 at 60–70C for 4 to 6 min prior to fluxing in a molten halide bath (42 per cent LiCl, 53 per cent KCl, 5 per cent NaCl) and hot-dip coating with zinc-aluminum (85:15).

1 claim.

No. 2,848,359, 8/19/58—Printed Circuits—P. Talmey, assignor to General American Transportation Co., Chicago, Ill.

A method of making printed circuits by electroless nickel plating is described.

13 claims, figure.

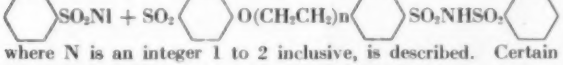
No. 2,848,391, 8/19/58—Lamination Construction—F. Fahnoe and J. Shyne, assignors to Vitro Corporation, New York, N.Y.

A multiple strip on a conductive base is laid down by electrophoresis wherein a porous layer is deposited followed by deposition of a metal over and through the porous material.

6 claims, figure.

No. 2,848,392, 8/19/58—Electrodeposition of Nickel—H. Ford and W. Shenk, assignors to Harshaw Chemical Co., Cleveland, Ohio.

Addition of compounds of the class



where N is an integer 1 to 2 inclusive, is described. Certain derivatives of the above compounds are also claimed.

7 claims.

No. 2,848,393, 8/19/58—Cadmium Plating—D. Foulke and O. Kardos, assignors to Hanson-Van Winkle-Munning Co., Matawan, N. J.

A bright cadmium bath is described as containing a water-dispersible cellulose derivative and a glycolic compound having the formla R O CH $(CHOCH_2)_n$ CH_2 OR,

where R is H and alkyls to 6 carbons and X is H, Me, Et, and n is 0 to 500.

10 claims.

No. 2,848,394, 8/19/58—Bright Copper Plating—D. Foulke and O. Kardos, assignors to Hanson-Van Winkle-Munning Co., Matawan, N.J.

What's in your plating bath?

One thing for sure, you can't tell just by looking at it. If you're shooting for smooth production and top quality work, analyze your bath at regular intervals and add only the correct amount of the proper ingredient required.

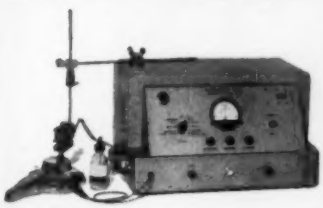
Control Your Solutions with KOCOUR TEST SETS

Kocour Test Sets provide the simplest and most direct analysis . . . they're easy to use and they're complete with reagents and glassware.

FOR EVERY PLATING PURPOSE

Kocour Test Sets are available individually or in economical combinations for the control of plating, cleaning, pickling, anodizing, sealing, coating, passivating, desmutting, deburring, phosphorizing, heat treating, pH control and thickness testing. Write for your FREE copy of "Lab Hints for the Plater".

KOCOUR ELECTRONIC THICKNESS TESTER, Model 955, for determining the thickness of plating.



90–95% accurate
virtually automatic
direct readings
simple operation

Model 955 determines the thickness of heavy or decorative chromium, silver, tin, cadmium, zinc, brass, copper, nickel, lead and other alloy deposits on various basis metals. Write for descriptive Bulletin 400 . . . and ask for a demonstration or 15-day Free Trial.

● KOCOUR are specialists and pioneers in testing equipment for controlling plating — cleaning — pickling — anodizing — and hardening processes . . . special sets can be provided for your requirements.

Write today for further information—no cost or obligation.

KOCOUR COMPANY
4801 S. ST. LOUIS AVENUE
CHICAGO 32, ILLINOIS

Specify KOCOUR test sets from your supplier.

A bright copper bath is claimed wherein titanium coordination compound is used an an addition agent.

13 claims.

No. 2,848,395, 8/19/58—Production of Titanium—C. Carignan, assignor to E. I. du Pont de Nemours and Co., Wilmington, Del.

A fused bath method for depositing titanium is claimed. See also No. 2,848,397, describing another fused bath method for producing titanium with 7 claims and assigned to New Jersey Zinc Company.

5 claims, figure.

No. 2,848,399, 8/19/58—Electrowinning of Zinc.—L. McGray and G. Lutz, assignors to American Zinc, Lead and Smelting Co., St. Louis, Mo.

The addition of benzene and naphthalene sulfonic acids is claimed.

8 claims.

No. 2,848,401, 8/19/58—Rifling Gun Barrels—J. Hartley, assignor to Olin Mathieson Chemical Corp., Va.

A method of rifling is described wherein portions of the barrel are stopped off, then a cathode and electrolyte are introduced and the rifling formed by anodic dissolution.

9 claims, figure.

No. 2,848,403, 8/19/58—Electrodializing—N. Rosenberg, assignor to Ionics, Inc., Cambridge, Mass.

A method for anodifying the concentration of an electrolyte (e.g. desalting) is claimed using alternate anion and cation permeable membranes and direct current. See also a similar patent issued to a Dutch firm, No. 2,848,402, with 5 claims.

9 claims.

No. 2,848,405, 8/19/58—Conveyor—J. and F. Lisowski, assignors to National Products Co., Newport, Mich.

A materials handling, especially electroplating, conveyor is described in 17 claims and 14 figures.

No. 2,849,097, 8/26/58—Barrel Treating—W. Jackson, assignor to The Udylite Corp., Detroit, Mich.

An improved barrel plating apparatus is claimed wherein the barrels can be rotated in the up or down position.

15 claims, 14 figures.

No. 2,849,297, 8/26/58—Cleaning Magnesium—A. Wisken, assignor to Magna Kleen, Inc., New York, N. Y.

Magnesium may be etched with a solution containing at least 65 per cent of an aliphatic alcohol (water miscible) 10–30 per cent of an inorganic mineral etching acid consisting of 2 parts of nitric and 1 part of hydrochloric acid, and up to 5 per cent of a lower aliphatic organic acid.

11 claims.

No. 2,849,299, 8/26/58—Chem-Milling of Honeycomb Structures—H. Young, Chula Vista, Calif.

Coat the structure with a tacky material, immerse in water to the level where it is desired to etch, spray projected portion with an acid resist. Remove honeycomb structure and etch.

6 claims, figure.

No. 2,849,336, 8/26/58—Boride Coatings—M. Reid and A. Brenner, assignors to the USA. (Commerce Dept.)

Heat the surfaces to be coated to 400 to 800C and bring into contact with borohalide vapor.

6 claims.

No. 2,849,344, 8/26/58—Porcelain Enameling—M. Cramer, assignor to Parker Rust Proof Co., Detroit, Mich.

Contact base stock with an aqueous solution containing As, Sb, or Bi salts to yield a coating of 5 mg to 3 g/sq ft, then heat in an oxidizing atmosphere to yield an oxide coating of 0.25 to 15 g/sq ft.

12 claims.

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By C. F. POWELL, I. E. CAMPBELL, and B. W. GONSER, all at the Battelle Memorial Institute.

1955. 158 pages. Illus.

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This is the first single source of reference for data and information on these processes. Provides a critical and authoritative review of the applications and techniques of vapor deposition of metals and non-metals.

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No. 2,849,348, 8/26/58—Electrodeposition of Nickel on Uranium—A. Gray, assignor to USA (AEC)

Treat the uranium with molten ferric chloride hexahydrate (50–70C) until a black film forms. Wash off film and plate.

3 claims.

No. 2,849,349, 8/26/58—Electrolytic Deposition of Aluminum—K. Ziegler, and H. Lehmkull, Mulheim, Germany.

Deposit from a melt of an organic aluminum compound of the formula Al R $(R')_2$ where

R is an alkyl group

R′ is selected from H, alkyl, halogen

and a compound of the formula

MeR′

where Me can be alkali metals or quaternary ammonium radicals and R′ same as above.

23 claims.

No. 2,849,351, 8/26/58—Electroplating—W. Gundel, assignor to Dehydag, Dusseldorf, Germany.

For Ni, Cu, Zn, Ag, bronze and brass, add to the plating bath sulfonic acids of the formula:

$$G—R—SO_3H$$

where G is an organic radical in which a carbon is linked to 3 hetero atoms, one a sulfur which connects R and the others being N, S or O and R is a bivalent aliphatic radical. An example is 2-thiometoxazine-S-butane potassium sulforate.

14 claims.

No. 2,849,352, 8/26/58—Electroplating—A. Kirstahler, et al, assignors to Dehydag, Dusseldorf, Germany.

A brightener for Cu, Zn, Cd, Ni, Ag, brass and bronze plating baths is described as having the formula:

$$R\ (—S—R_1—SO_3X)n$$

where R is selected from the group of straight chain and cyclic organic radicals comprising at least two carbon atoms linked exclusively to O, N or S.

R_1 is a bivalent lower aliphatic radical, X is H, akali metal or NH_4^+, n is an integer equal to said carbon atoms in radical R.

10 claims.

No. 2,849,353, 8/26/58—Bright Nickel Plating—O. Kardos, assignor to Hanson-Van Winkle-Munning Co., Matawan, N. J.

2-Butene-1,4-diol is claimed as a brightener in nickel baths along with sulfo-oxygen compounds.

3 claims.

No. 2,849,354, 8/26/58—Purifying Chromium Electrowinning Solutions—M. Carosella, assignor to Union Carbide Corp., New York, N. Y.

Hold the electrowinning solution at *p*H of 1.0 to 2.25, electrolyze for at least 30 amp hrs/gal to precipitate lead, then electrolyze out the chromium in another cell.

2 claims, figure.

No. 2,850,369, 9/2/58—Buffing Composition—W. Riegler and J. Dybalski, assignors to Armour and Co., Chicago, Ill.

The compound N-tallow-N,N′,N′-tris (hydroxyethyl) trimethylene diamine is claimed as an anti-slaking additive for lime buffing compounds. Broadly radicals other than tallow may be used where R is 8 to 22 carbons.

6 claims.

No. 2,850,415, 9/2/58—Treating Metals with Ferrate Solutions—J. Rufford, assignor to E. I. duPont de Nemours and Co., Wilmington, Del.

For corrosion resistance and to give a better dye receptive surface, contact the metal surface (ferrous and zinc) with an aqueous ferrate solution at 50C and then with a silicate or dichromate solution at about 140C.

See also No. 2,850,416, assigned to same company which describes baking the ferrate film in 14 claims.

8 claims.

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L—101. Room Temperature Iron Phosphate—Klem Chemicals, Inc. is introducing a new idea and process in iron phosphates. It is used at temperatures as low as 70F to a maximum of 120F. Coating weights up to 150 mg/sq. ft are attained, depending on type of metal and concentration.

A brochure covering two to multiple stage systems is available.

The savings in heat are obvious and this savings can run as high as eight times the chemical cost, according to the manufacturer. Chemical costs are lower due to the absence of evaporation and maintenance costs are lower due to easier clean-out and less breakdown.

L—102. Washer-Dryer with Reversible Motor—A high torque, reversible motor makes it possible for Barrett centrifugal washer-dryers to handle extra heavy loads and difficult drying jobs after plating and tinning operations. These units, described in a new 16-page illustrated booklet of Barrett centrifugal machinery, handle up to 425 lb of plated metal parts. The reversible motor makes it possible to rinse and dry irregular parts with deep recesses or blind holes and leave their brightly polished finish free of salt stains and water marks. In use, the high torque motor accelerates a normal load to top running speed (up to 1200 rpm) and a fan-shaped water curtain is directed into the parts. This removes all traces of plating solution and other foreign matter.

L—103. Filters—Depth-type fiber cartridge filters for full flow filtration of all types of fluids are described in the new Micro-Klean catalog of the Cuno Engineering Corp.

Complete information is given on Cuno's "graded density" cartridge construction. Selection of the proper filter and filter cartridge to meet requirements is facilitated by the Micro-Klean selector chart, cartridge life curve, flow rate table, and other product performance information contained in the catalog.

L—104. Stripping Compound—Oakite Stripper S-A, recently developed by the laboratories of Oakite Products, Inc., for the stripping of epoxy resins, acrylics, vinyls, polyesters and other hard-to-remove finishes, is described in a recently issued four-page folder.

Combining solvent and acid properties with a builtin water seal, Oakite Stripper S-A is used full strength, at room temperature. Parts are stripped by immersing them completely in the solvent-acid phase. The following advantages of the material are reported: its ability to reclaim imperfect parts which were formerly rejected; its ability to strip tough finishes from parts of paint-spraying equipment so that they may be used again and again; its economy in use because it requires no heating; and its safety on steel, stainless steel, aluminum, brass and copper.

L—105. Vibrator—Twelve-page, 3-color, letterhead-size bulletin, "Introducing the Lorco Vibrator . . . a new concept of precision finishing," tells about a new, effective method of precision finishing. Lorco vibrators are said to work 10 to 100 times as fast as tumbling barrels. The exceptional speed and control possible are due to three-way vibratory action. Both amplitude and frequency of vibration can be varied to fit a wide range of requirements. Vibrators are available with tilting bowls for discharge or designed for completely automated conveyor-line production.

Bulletin 258 of Lord Chemical Corp. is illustrated by 25 "before and after" photographic reproductions of products finished by this new method.

L—106. Cold Solvent Evaluation—A new "safety in use" approach for evaluating the relative safety of solvents used in "cold cleaning" of metal parts is contained in a new technical report published by the Du Pont electrochemicals department.

The report establishes a new concept of a relative safety index for solvent evaluation based on maximum allowable concentration, vapor pressure and evaporation rate of the solvents. Results are confirmed by extensive testing of the atmosphere during "cold cleaning" operations using two commonly used solvents, perchlorethylene and methyl chloroform (1,1,1 trichloroethane).

L—107. Anodes and Plating Chemicals—A new eight-page, two-color bulletin AC-111 describing a complete line of anodes and plating chemicals is offered by Hanson-Van Winkle-Munning Co.

Illustrated by photographs and line drawings are a wide variety of anodes, anode hooks and anode bags. Details are set forth as to composition, shapes and specific application. Specifications are given for round, flat, elliptical and specially shaped anodes, including nickel, cadmium, brass and bronze, copper, zinc and lead. Also described are the new Lo-Sludge nickel anodes recently developed in H-VW-M's electrochemical laboratory.

The bulletin discusses the criteria for anodes, with emphasis on suitable metallurgical structure to promote even and uniform corrosion with minimum sludge formation, purity, chemical composition and conformation for exposure of maximum active anode area per pound.

L—108. Surface Treatment Solution—A liquid acid solution that produces a bright, smooth surface on stainless steel, aluminum alloys, and low and high carbon steels, is described in Technical Data Sheet No. 81, a three-page usage and instruction sheet prepared by MacDermid, Incorporated. Called Electro-Gleam 55, the product is said to remove scratches and other surface defects, deburrs and removes sharp edges, improves corrosion resistance and adherence of plated work, and reduces friction. Stainless steel can be used as treated with Electro-Gleam 55. Aluminum may be used as treated or anodized, chromated or plated. Carbon steels are usually either deburred, smoothed or prepared for electroplating by treatment in this solution.

L—109. Cleaning and Finishing Machinery—A new bulletin offering information in compact, 2-page form has been made available by Cincinnati Cleaning and Finishing Machinery Co. It describes types of machines and systems, and processes used in cleaning and finishing metal products.

L—110. Spray Nozzles—New Bulletin 6A-627, just prepared by Schutte and Koerting Co., describes the company's line of spray nozzles.

The nozzles produce medium to coarse, uniformly distributed, solid cone sprays with a normal spray angle of 70°. Nozzles are shown in several sizes to provide a wide range of capacities depending upon the size of orifice opening and liquid supply pressure.

The bulletin includes information on capacities, sizes, dimensions, and materials of construction—plus photos showing the liquid spray distribution patterns of a nozzle operating at several pressures.

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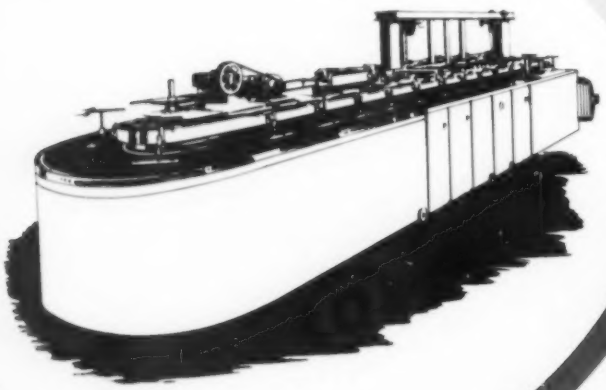

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Methods for Testing Thickness of Electrodeposits, II & III—By H. J. Read & F. R. Lorenz — *Serial 27 Project 7* **$1.35**

Porosity of Electrodeposited Metals—By N. Thon, D. G. Kelemen, L. Yang, S. Yang, D. Dean — *Serial 28 Project 6* **85 Cents**

The Analysis of Electroplating Solutions for Major Constituents—By E. J. Serfass & M. H. Perry — *Serial 29 Project 2* **90 Cents**

Effect of Basis Metal Condition on Plating, I & II—By A. E. R. Westman & F. A. Mohrnheim — *Serial 30 Project 14* **$1.10**

Effect of Surface Finishing of Nonferrous Base Metals on Protective Value of Plated Coatings—By G. J. Kahan, W. W. Macchia, J. M. Fairbank — *Serial 31 Project 4* **45 Cents**

How the Small Electroplater Can Treat Cyanide Plating Waste Solutions with Hypochlorites—By Barnett F. Dodge and Walter Zabban, Yale University, New Haven, Connecticut — *Serial 33 Project 10* **50 Cents**

Effects of Impurities and Purification of Electroplating Solutions, IX, X & XI—By Dr. D. T. Ewing, Dr. A. J. Smith & Dr. W. O. Dow — *Serial 34 Project 5* **50 Cents**

Cleanability and Oil Spreading Rates—By H. B. Linford & P. E. Grubb — *Serial 35 Project 12* **50 Cents**

The Nature, Cause and Effect of the Porosity in Electrodeposits, I & II—By Fielding Ogburn, Asaf Benderly and Margaret Hilkert — *Serial 36 Project 13* **$1.00**

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The Influence of the Physical Metallurgy and Mechanical Processing of the Basis Metal on Electroplating IV—By M. H. Jones, Chih-Yeu Lu and J. Zajdowski — *Serial 38 Project 14* **$1.25**

Mechanical Finishing of Metal Surfaces—Bibliography—By C. E. Kennedy, J. E. Fritts, R. S. Modjeska, L. E. Weeg & R. V. Twyning — *Serial 39 Project 18* **50 Cents**

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SODIUM CYANIDE, domestic, f o b N. Y., 200 lb drums	23.70
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PATENT ABSTRACTS

(*Continued from page 65*)

No. 2,852,463, 9/16/58—Plate Clamping Mechanism—E. Gutzmer, assignor to Intercompany Corp., Chicago, Ill.

A rack with a pair of cooperative clamping mechanisms to grip opposites of a plate to be electrolytically treated is claimed.

7 claims, 6 figures.

No. 2,853,372, 9/23/58—Etching Aluminum—L. McDonald and D. Miller, assignors to Kelite Products Inc., Los Angeles, Calif.

The use of a small amount of lower alkyl naphthalene sulfonates in an aluminum etching bath is claimed. An example is di-isobutyl methylnaphthalene sodium sulfonate.

6 claims.

No. 2,853,406, 9/23/58—Metal Coating—L. Schuster and A. Baldi, assignors to Kelsy-Hayes Co., Detroit, Mich.

A method for providing a corrosion resistant surface for ferrous materials consists of etching in 1–20 per cent nitric acid for 2 to 70 sec at 60 to 150F, then applying an aqueous chromic acid solution ($\frac{1}{2}$ to 10 per cent) to the surface and drying.

8 claims.

No. 2,853,441, 9/23/58—Treatment of Uranium—O. Flint assignor to USA (AEC)

Anodizing in citric acid solution is claimed to provide a bright lustrous finish on uranium bodies.

15 claims, figure.

No. 2,853,442, 9/23/58—Method of Plating—W. Swanton, assignor to Pfaudler Permutit, Inc., Rochester, N. Y.

Claim 1 states: "In an electrolytic process wherein heat is generated during the electrolytic action occurring in an electrolytic bath and said bath is diluted by a stream of make-up water, the method of controlling the temperature of the bath and concentrating the electrolyte which comprises the drawing of electrolyte from the bath, maintaining said withdrawn electrolyte under sub-atmospheric pressure for evaporating a portion of the same for concentrating and cooling the remainder, returning said cooled and concentrated electrolyte to said bath, and regulating the quantity of electrolyte withdrawn from said bath and returned thereto in accordance with the temperature of the electrolyte in order to maintain the temperature of said bath within predetermined limits.

4 claims.

No. 2,853,443, 9/23/58—Acid Copper Plating—R. Harrover, assignor to Westinghouse Electric Corp., East Pittsburgh, Pa.

To prepare an acid copper addition agent mix equimolar quantities and heat of a compound having the nucleus—CONHCS—with an alkyloloamine. Add 0.0001 to 0.5 oz/gal of the resulting compound to the bath. Example I describes the reactants as 1-acetyl-2-thiohydantoin and monoethanol-amine.

16 claims.

No. 2,853,444, 9/23/58—Electrowinning—D. Pye and G. Schurz, assignors to Dow Chemical Co., Midland, Mich.

The use of 25–150 ppm. of polyethyleneimine in an acid zinc electrolyte is claimed.

9 claims.

No. 2,853,445, 9/23/58—Etching Aluminum Foil—A. Catotti and P. Grad, assignors to Aerovox Corp., Mass.

An element more noble than aluminum is connected by a conductor to the foil as the aluminum strip enters the bath and said electrode nobler than aluminum is immersed in an acid-salt solution under which the aluminum strip passes.

8 claims, figure.

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- No breakdown or formation of organic contamination.
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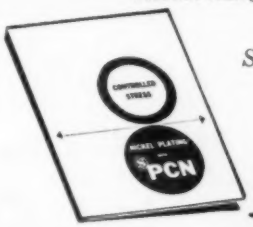

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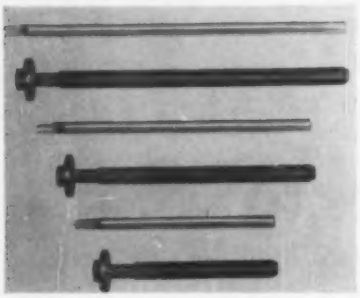


E—101. Immersion Heater—Announcement has been made by Thermel, Inc. of a new immersion electric heating unit in which the cast insert may be easily removed from the outer shell assembly. This makes possible the changing of the insert without draining the tank.

This unit is used for heat transfer in oils, water, caustics and alkali cleaning solutions, and vapor degreasing compounds. These inserts are available for pipe and finned tube heaters.

E—102. Metallic Color Process—Heatbath Corp. has introduced the Duracoat D-Y process for producing a variety of brilliant metallic colors on zinc plate at low cost. Duracoat D-Y is a powdered chromate material and solutions are made up using only 1-⅓ oz/gal of water plus a small amount of nitric acid. This produces the clear blue chromate film that can be dyed various colors.

An assortment of Heatbath dyes is available for dyeing the chromate films produced. The dye solutions are made up using ⅓-⅛ oz of dye powder per gallon of water.

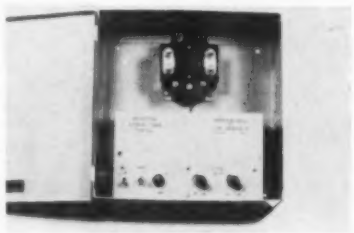
E—103. Corrosion Test Cabinet—The new G-S (steel or stainless steel, epoxy lined) corrosion test cabinet features developments to improve test conditions and results for laboratories and metal finishers, according to The G. S. Equipment Co.

The new cabinets are either stainless or mild steel, all-welded, epoxy lined (noncorroding, rust-proof), and uniformly heated throughout by full-coverage water jackets on all four sides and bottom (cabinet within a cabinet).

The removable H-T plexiglas transparent lid is important visual aid factor for observing tests in progress without opening cabinet, interrupting process or disturbing specimens. Cam-type (nonfastening) gravity "hinges", front and back, provide for easy manual opening of lid from either direction—or for lifting off entirely.

E—104. Photo Resist Stripper—Most photo resist materials used in printed circuit manufacturing may be removed by a 30-sec dip in new Resistrip, according to an announcement from Sel-Rex Corp. The new cold stripping solution is said to provide two important advantages which can result in substantial increases in production. (1) Stripping time is reduced to a fraction of the time required through conventional means. (2) Its use results in chemically cleaner surfaces ready for subsequent plating or dip soldering operations.

The Resistrip formulation (patent pending) contains an ingredient designed to minimize rejects of costly completed circuit boards. Any traces of photo resist not removed by the initial 30 sec dip are said to show up clearly as brownish film. It is claimed this feature will eliminate rejects due to faulty plating and short circuiting often traceable to incomplete removal of photo resist. This "self-indicating" feature is also said to facilitate gaging of immersion-time required to remove photo resist of different types and varying thicknesses.



E—105. Current Interrupter—A line of periodic current interruption units is announced by Fellows Engineering Co. The line includes switching capacities of 100, 300, 600, 1000, 1500 and 2000 amp dc, 12 v or less.

A recycling electronic timer provides variable ON and OFF time intervals which are independently adjustable over the range specified. Any time interval between one and 180 sec can be provided.

The current interrupter and timer are packaged in a single box for ease of installation and operation. Overall size varies for 6 x 12 x 12 in. for the three lower capacities to 6 x 12 x 18 in. for the 1500 and 2000 amp units.

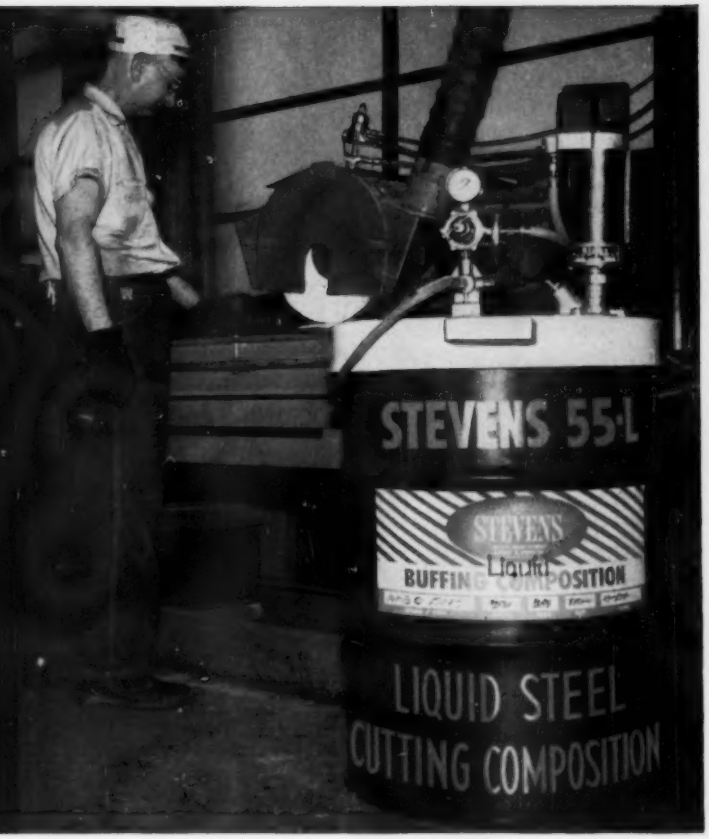
E—106. Electronic Plater—The latest addition to the Ramyr plating equipment "family" is their new Electronic Plater that is designed specifically for precision plating of precious metals on electronic components.

Three exclusive features include: (1) Sangamo ampere hour meter, available in various sizes, to accurately measure deposition of metal and to determine amount of metallic content to be replaced; (2) 0 to 1 ampere meter, with 20 milliampere graduations. A separate fuse on the meter protects against overloads; (3) automatic timer regulates plating interval—includes a switch to by-pass timer unit when longer plating cycle is desired.

Overall size of plater is 14¼ high x 14½ deep x 21½ in. wide. Also available in 20 ampere and larger sizes according to specifications.

E—107. Miniature pH Electrode Measure—A new miniature *p*H electrode assembly is offered by Leeds & Northrup Co., for use with samples ranging in size from one drop up. The two electrodes, reference and measuring, can be inserted in an opening of 7 mm dia, and a flexible electrode support then permits the user to squeeze the two elements together and thus accommodate to single-drop sample, as for instance in the tip of a centrifuge tube. Self-shielding of the measuring electrode is said to eliminate the compartmental shielding usually required and avoids the need for sample transfer. Use of the assembly is not limited to small samples, however; it may be used at any electrode immersion of 10 cm or less. The *p*H range is 1 to 11.5; temperature range for sample is 15 to 40C. The measuring instrument recommended by the maker for use with this electrode is L&N No. 7664 *p*H Indicator.

For an excellent fast finishing job on steel



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Stevens 55-L Liquid Cutting Composition is the ultimate in liquid-type fast cut. It's a stable, non-settling, emulsion-type product. Its flash point is high, and its abrasive is a high quality, iron free, pure aluminum oxide grit.

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4. Is a high flash point, stable, emulsion-type composition
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6. May be sprayed or brushed
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445 Broad Street, Newark 2, N. J.

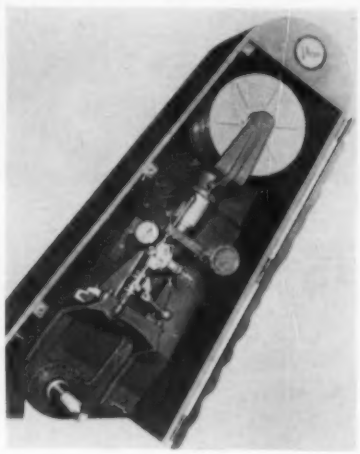
E—108. Epoxy Coating—Permacel has developed a new flexible epoxy protection coating. The product, Permacel PRH 400 is a solvent based epoxy system for use as a protective coating for printed circuits and other electrical and electronic components. It can also be used to protect metallic materials from rust and corrosion.

Thin coatings of the product are said not to crack or craze even under severe stresses or prolonged subjection to abrasion, chemicals or moisture.

It can easily be applied by dip, brush or spray methods and will cure at room temperature.

E—109. Abrasive Belt Attachment—A Model DL air-operated abrasive belt attachment, which converts any polishing and buffing head unit or lathe to accomodate abrasive belts in addition to wheels and buffs is now being marketed by the Machinery Division of Divine Brothers Co.

When used with abrasive belts, a contact wheel is mounted on the head or lathe unit spindle and the abrasive belt is placed over this contact wheel and the idler pulley of the attachment.



Desired air pressure is set by means of the regulator and gage. The air control valve is then moved to the right and the belt is immediately tightened to the preset tension. This tension is accurately maintained regardless of work pressure or belt stretch.

To release the belt for storing or changing the air control valve is simply moved to the left and the belt is immediately slackened. The belt tracking control knob extends through the hood cover for convenience in adjusting when the hood cover is closed.

The belt is available in widths from 6 to 10 in. and is 120 in. long. Contact wheels of 12, 14 or 16 in. may be used, and contact wheels of any desired density or construction can be furnished with this attachment.

E—110. PVC Repair Kit—Perma-Line Rubber Products Corp. has developed the tools and accessories required to make repairs on polyvinyl chloride linings of acid tanks. The tools can also be used to make repairs on plastisol coated plating racks and plastic duct work. These are professional tools, identical to those used in putting on the tank linings in the first place.

Most repair jobs can be handled quite simply with the correct tools, according to Perma-Line.

E—111. Work Glove—The Pioneer Rubber Co. has added a new V-20 medium weight glove to the Stanflex line.

The Stanflex V-20 gloves were tested in 50 per cent solutions of nitric and chromic acids and withstood the deteriorating effects of both acids even after 48 hours of immersion. Except for discoloration in the chromic acid solution, the performance tests of the Stanflex V-20 is said to have proved more than satisfactory.

The new gloves are claimed to be resistant to alkalis and inorganic acids, oils, greases and some solvents. Tests have shown that they stay flexible even under unusual conditions.

Available in small, medium and large sizes, the new gloves offer ample wrist protection.

E—112. Plastic Centrifugal Pump—Another first in the field of new plastic equipment is the line of all-plastic PVC centrifugal pumps of Vanton Pump & Equipment Corp. The application of the excellent corrosion resistance of PVC to a centrifugal pump design opens up a new area for solving many difficult pumping problems.

This line of pumps is constructed with all wetted parts of unplasticized, unmodified polyvinyl chloride. Available in four pump sizes, these units offer capacities from 10 to 180 GPM with discharge heads to 100 ft. Solution temperatures to 140F can be handled.

The heavy sectioned PVC casing is totally protected by a cast iron frame giving rigid support. All PVC centrifugals are equipped with mechanical shaft seals in a range of materials to cover virtually all corrosive applications. Pumped fluid contacts only the facings of rotating and stationary rings.

PERSONALS

J. Ross

Dr. R. A. Schaefer

Jerry Ross is the newly appointed manager, Equipment Division, Sel-Rex Corp., Nutley, N. J. Sales engineer with the company since 1949, Mr. Ross had been in charge of plating equipment and supplies sales for the past two years. In his new position, he will be responsible for engineering, pricing and surveys, for major equipment and plating facility installations.

A chemical engineering graduate of Columbia University, Mr. Ross was previously associated with DuPont in sales, research and technical service for eleven years, five years with the Carlton-Cook Plating Co. as plant superintendent, two years with Century Plating and Engineering as plant manager, and one year with North American Aviation as superintendent of finishing.

John L. Goheen has been named assistant manager of the Los Angeles Office of Climax Molybdenum Co., division of American Metal Climax, Inc.

Goheen, who has more than 20 years' experience in the metallurgical field, has had close contact with West Coast industry.

Mr. Goheen received his MS in physical metallurgy from Massachusetts Institute of Technology in 1937. He is currently a member of the American Society for Metals and the American Institute of Mining, Metallurgical and Petroleum Engineers.

Carleton A. German was recently promoted to the position of industrial sales manager of Solventol Chemical Products, Inc. Mr. German started with Solventol in 1944. His long experience covers the application of chemicals and the design of metal cleaning equipment in industrial processing operations. In his new position, Mr. German will be responsible for sales and service of Solventol chemicals and equipment for the United States and Canada.

Dr. Ralph A. Schaefer has been named director of the newly created research and development department of The Bunting and Bronze Co., Toledo, Ohio.

Dr. Schaefer is well known for his research and development in the sleeve bearing field, is the holder of many patents, is the author of many published works, and has explored developments in many phases of the bimetal and trimetal field, as well as in powdered metals.

Dr. Schaefer received an AB, MS and PhD from Western Reserve University, and is a native of Grafton, O.

He is a vice president of the Electrochemical Society, past national president of the American Electroplaters' Society, a member of the American Society for Testing Materials, American Society for Metals, American Institute of Mining and Metallurgical Engineers, American Ordnance Association, and many other professional organizations.

He has headed the Cleveland Branches of both the AES and the Electrochemical Society, and has held office in other societies relating to his profession. His entire professional career has been with Cleveland Graphite Bronze and its allied enterprises. Upon his graduation from Western Reserve, he went with this company as a research chemist and was director of research from 1946 to 1952. In 1952 the Clevite Corporation was formed by a merger of Graphite Bronze and other enterprises. After the consolidation, the corporation created a centralized research and development division with Dr. Schaefer as vice president. In 1955, he was promoted to the position of technical advisor to the president.

Russell N. Keppel, formerly director and vice president in charge of marketing for Esso Standard Oil Co., has joined Prufcoat Laboratories, Inc., Cambridge, Mass., as vice president.

Mr. Keppel, who will make his headquarters at Prufcoat's New York City sales office, has broad experience in both domestic and overseas marketing.

Arthur E. MacQuilkin has been made executive vice president and general manager of Industrial Filter & Pump Mfg. Co., Cicero, Illinois.

Mr. MacQuilkin joined the company in 1946 and has served as controller and secretary. He is also vice president of the Cicero Manufacturers Association.

I. K. MacGregor is newly appointed as vice president—staff operations of American Metal Climax, Inc. Mr. MacGregor had formerly served as vice president—eastern operations of the corporation's Climax Molybdenum Co. Division.

J. R. Schaffner

P. J. Verlinich

James R. Schaffner has been elected secretary-treasurer of Schaffner Mfg. Co., Inc., Pittsburgh.

Mr. Schaffner, after completing an extensive research program, was assigned to sales under the direction of Paul E. Schaffner. He will continue his interest in sales together with his new responsibilities.

Peter J. Verlinich has been appointed director of public relations of Schaffner Mfg. Co., Inc.

Mr. Verlinich was formerly associated with the Rockwell-Standard Corp. for 21 years, in the capacity of supervisor in the finishing of ferrous and non-ferrous metals and is thoroughly conversant with the finishing processes.

Dr. Frederick M. Robbins and **Herbert L. Jones Jr.** have been appointed as senior chemists in the product development department of Atlas Powder Co.'s Chemicals Division.

A graduate of Lafayette College, Dr. Robbins joined Atlas after receiving his doctorate in chemistry from Lehigh University. Previously he had served as a chemist with the Dixie Cup Co. and C. K. Williams Co., both of Easton, Pa.

Mr. Jones came with Atlas from the Mellon Institute, Pittsburgh, where he headed the Fibrous Material Fellowship since 1955. Previously, he was employed as a research engineer with the American Pad & Textile Co., Greenfield, Ohio. He received his bachelor's degree in chemistry and chemical engineering from Penn State University and his master's degree in chemical engineering from the University of Pittsburgh. Mr. Jones is assigned to the company's Darco activated carbons laboratory.

Lionel DeWaltoff has been appointed technical director of the industrial service

division, Octagon Process, Inc., Staten Island, N. Y.

He is well known in industry, through his development of many of the processes, techniques and materials used in the plating and finishing fields. He has given many lectures and has presented papers at chemical, metal and other societies.

Mr. DeWaltoff is a graduate of Columbia University with a BS degree in chemistry, and has taken numerous courses in advanced chemistry, metallurgy, electrometallurgy and corrosion engineering at Columbia University, New York University and Stevens Institute of Technology. He is an active member of many technical and honorary societies, including the American Chemical Society, Electrochemical Society, Faraday Society, American Electroplaters' Society, Technical Depositors Society, American Society for Metals and National Society of Corrosion Engineers.

Frank G. Pollard is a recent addition to Wyandotte Chemicals (J. B. Ford Division) industrial research staff, at the corporation's Wyandotte, Michigan, laboratory.

Mr. Pollard, in his 10 years of experience, has served several Detroit area companies. Adhesives engineer, research chemist, and research director in the adhesives industry makes up his background. His experience also includes chemical sales and service in the metal finishing industry.

Born in Canada, he holds a BS degree

L. DeWaltoff

F. G. Pollard

in chemical engineering from Queen's University, Kingston, Ontario, Canada. He also attended the University of Michigan.

Robert H. Ebersole has been named district manager of the Detroit Sales Office of the Federated Metals Division of American Smelting and Refining Co.

Born in Muskogee, Oklahoma, in 1916, Mr. Ebersole spent four years as a pilot in the Army Air Force. He joined Asarco as a sales trainee for the Federated Division in 1945. Since 1955, he has been a sales representative in Detroit.

Mr. Ebersole attended Westminster College, Jefferson College, Purdue University and Washington University.

Edward A. Perry has joined American Smelting and Refining Co. as a technical representative in the electroplating department of the company's Federated Metals Division.

A chemistry graduate of Baldwin Wallace College in Berea, Ohio, Mr. Perry has spent the past six years in the electroplating department of the McGean Chemical Co. in Cleveland.

Mr. Perry will make his headquarters in the Federated Cleveland office at 1422 Euclid Avenue, and will operate in the midwestern area.

William H. Steinberg, technical consultant and recently sales manager of the abrasive wheel department, retired after 41 years with the Manhattan Rubber Division of Raybestos-Manhattan, Inc.

Mr. Steinberg made probably his largest contribution to industry in connection with the development of Manhattan's line of the cut-off wheels.

Charles William Thomas, Arcadia, Calif., **Richard Dale Taylor,** Phoenix, N. Y., **Ruel K. Shumway,** St. Louis, Mo., **Donald H. Schultz,** Elm Grove, Wisconsin, and the Industrial Sales and Engineering Company, Inc., Kalamazoo, Michigan, have received appointment as sales representatives for the Techline Division, Wheelabrator Corp.

A graduate of Pasadena City College, Mr. Thomas is a long-time California resident and has more than seven years of experience in industrial sales work in the Los Angeles area. His territory includes the entire state of California.

Mr. Taylor has more than six years of experience in selling barrel finishing equip-

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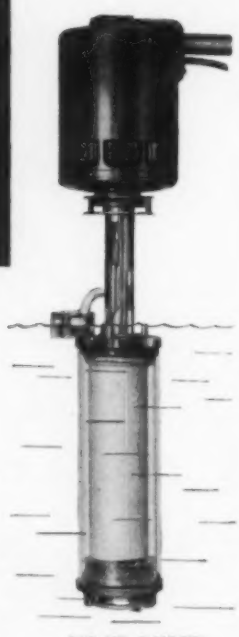

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ment and supplies in New York and Pennsylvania in addition to experience as a process technician for a barrel finishing equipment manufacturer. He is a member of the American Electroplaters' Society. His territory includes the majority of the state of New York, plus 13 counties in Pennsylvania.

Mr. Shumway has approximately 25 years of experience in the plating and anodizing field and since 1952 has sold electroplating supplies and equipment. He is a member of the American Electroplaters' Society and the American Society for Metals. His territory includes Missouri, Kansas, Arkansas, Oklahoma and three counties in southwestern Illinois.

For the last twelve years, D. H. Schultz has operated the Eldon Company, Milwaukee, in the distribution of barrel finishing equipment, supplies and associated items. He will continue this arrangement providing complete service, equipment and supplies throughout the states of Wisconsin, Minnesota and Winnebago and Boone Counties in Illinois. Mr. Schulz also is a member of the American Electroplaters' Society.

The lower peninsula of Michigan will be covered by the Industrial Sales and Engineering Company, Inc., Kalamazoo.

John W. Priesing has been named West Coast sales representative for Solvay Process Division, Allied Chemical Corp.

In his new post, Mr. Priesing will be responsible for developing sales of Solvay products in the Pacific Coast states.

A liberal arts graduate of Amherst College, Mr. Priesing received a Master's degree in business administration from Harvard Business School. He joined Allied Chemical in 1956 as a financial analyst. In December of that year Mr. Priesing transferred to Solvay Process and was assigned to the Detroit, Mich., sales branch. He is now located at Allied Chemical's Consolidated Sales Office, 235 Montgomery Street, San Francisco, Calif.

Mr. Priesing served in the U. S. Navy as a Gunnery Officer. He is presently a Lieutenant Sr. Grade in the Reserves.

R. T. Gore, formerly a member of Metal & Thermit Corp.'s market development staff, has been appointed sales engineer and will specialize in introducing new products to electroplating plants and shops in the northeastern states.

W. W. Brodin, sales engineer, previously connected with Metal & Thermit's Rahway, N. J. office, has been transferred to the company's East Central Regional office and will serve plating and coating accounts in the Detroit-Toledo area.

Charles Fazekas, formerly an organic coating service engineer for Metal & Thermit, has been appointed sales engineer in the northeastern region.

HARVIE J. JOHNSON

Harvie J. Johnson, vice president of Belke Manufacturing Company and member-at-large of the American Electroplaters' Society, died in Springfield, Ohio, November 28, at the age of 59. A resident of 7126 Nagle Avenue, Chicago, Mr. Johnson had been associated with the Belke Manufacturing Company and the plating industry since 1932. Surviving are his widow, Lillian, a sister, Florence, and a brother Roy, who is also associated with the plating industry.

MANUAL AVAILABLE TO BRANCHES

As a reference source to help Branches and Branch officers in effective Branch operation, many dedicated National and Branch leaders collaborated, without any remuneration, in preparing the comprehensive BRANCH OFFICERS MANUAL of the American Electroplaters' Society, embodying practically every conceivable Branch operating subject from membership promotion to Delegates' duties.

Within red covers bound by Chicago screws, this 225-page consolidated mimeographed looseleaf book is now in use in 36 AES Branches that ordered copies.

A limited extra quantity of the book is still available at National Headquarters for the accommodation of Branches that have not previously ordered copies. These will be sold to Branches (only), on a first-come, first-served basis so long as that supply lasts, at $5.50 per copy, including postage to one destination.

Write American Electroplaters' Society, Inc., American Building, 445 Broad Street, Newark 2, N. J. Payment should accompany order to obviate unnecessary bookkeeping expense.

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2439	(*2.4–3.9 pH)	7387	(7.3– 8.7 pH)
		8610	(8.6–10.0 pH)
1028	(1.0–2.8 pH)	10113	(10.1–11.3 pH)
0414	(0.4–1.4 pH)	11131	(11.0–13.1 pH)

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BRANCH NEWS

Total AES Branches U. S., Canada Australia, December 1, 1958—58.

BALTIMORE-WASHINGTON
Visit Naval Gun Factory; Invited to Blum Dinner

The November meeting of the Baltimore-Washington Branch was held Nov. 12, at the Naval Gun Factory in Washington, D. C.

Members and their guests enjoyed cocktails from 6:00 to 6:30 and a delicious steak dinner followed. The cocktails and dinner were served in the Officers' Mess.

Captain Simpson and **O. W. Tomlinson** welcomed the members and their guests and explained that the Naval Gun Factory plating department has been undergoing a gradual change from the heavy plating of gun barrels and mounts to the plating of rocket and missile parts and the finishing of aluminum.

Dr. Gwendlyn Wood, president of the Electrochemical Society, invited the members to a dinner on Nov. 20, 1958, at the Brook Farm Restaurant, Chevy Chase, Maryland, to honor **Dr. William Blum** as the first recipient of the William Blum Award of the Baltimore-Washington Section of the Electrochemical Society.

A conducted tour of the plating department followed. Unique among the various processes exhibited was the method of plating the bore of the 18-inch naval guns.

A new member was elected.

Harold W. Scott
Secretary

BLUE RIDGE
Barrel Finishing Media Presented by Kohler

The Blue Ridge Branch held its regular monthly meeting Nov. 7, at 6:30 p.m. at the Hut restaurant near Martinsville, Virginia with **T. R. Boggess** presiding.

Two new men were elected to membership.

Art Kohler, Technical Director of Frederick Gumm Chemical Co. spoke on "The Role of Medium and Compound in Barrel Finishing". Art exhibited and explained use of each type of tumbling media, their forms and purpose. Samples were shown illustrating the results of combinations of media. Methods of test tumbling were given.

Next meeting was announced to be held in Martinsville, Virginia December 5, 1958. Metal and Thermit is going to send us a speaker who will give a program on Alkaline Tin Plating.

Everyone was urged to bring a few samples of their finishing work to the meeting for display and discussion.

Carl Witherspoon
Secretary-Treasurer

BOSTON
Baker Speaks on Used Equipment

Boston Branch met Thursday, June 6, 1958 at the Hotel Statler-Hilton with President **Flores** in charge. **Hugh Foley** reported a successful operation of the annual technical session and banquet. The report of the Annual Meeting at Cincinnati was read by the secretary of the Delegates, **Manson Glover** and was also endorsed by the other two delegates **Swift** and **Gagnon.**

It was announced that any new branch chartered after June 1958 would receive $100 from MFSA. **Ralph McCahan** of Hartford was elected chairman-elect of the National Educational Committee and **Wayne Martin** of Boston appointed to serve on the 'Speaker's List' Section of the Educational Committee.

Wayne Martin presented **Steve Baker** of Baker Bros. Co. speaking on "Selection and Use of Used Electroplating Equipment." Steve showed how his company bought all types of good used equipment in all sizes, took it apart for complete overhaul, tested all auxiliary attachments, replaced worn items and checked out a complete working unit. He discussed the locations of the purchased material and the new location on several items and mentioned that one large automatic unit was broken down and rebuilt to make three smaller automatics. After a lengthy discussion period, the meeting adjourned for beer and sandwiches served by the Branch.

The new officers elected were **John Wright,** president; Hugh Foley, 1st vice president; Wayne Martin, 2nd vice president; G. P. Swift, secretary-treasurer; **George Maretta,** librarian; **Joe Whalen,** Sergeant at Arms and **Lou Love, James Anderson, Elston Flores** and **Andy Garrett,** Board of Managers.

George P. Swift
Secretary

BOSTON
Gagnon Chairman 1961 Convention; Pierdon Talks on Costs

Boston Branch met Thursday, Oct. 2, 1958 at the Statler-Hilton with President **Wright** in charge. The current delegates, **Gagnon, Swift** and **Glover** were re-elected together with the current alternates **Chesworth, Chisholm** and **Charles Levy.** Branch Exhibits at the Convention were discussed and it was finally voted that the Branch approve having an exhibit and the chair appoint a committee of three to decide on a theme for the exhibit. Lou Gagnon was appointed chairman of 1961 Convention Committee.

George Marotta presented **Arthur G. Pierdon** of Art Metal Finishing of Washington, D. C., speaking on 'Plating Costs.' Art discussed the various divisions of price estimating based on a function of direct labor. He distributed a general breakdown under 18 items of major costs and showed how these linked together for an overall picture. As usual fringe costs, supplies, maintenance, overhead, office supplies, metal costs and labor were prominent. The question period brought out amplification of definitions of direct labor, manufacturing supplies, methods of quotation, expense comparison of large & small jobs, time cards per job and general time requirements.

George P. Swift
Secretary

BOSTON
Corrosion Discussed by Dr. Brown

Boston Branch met Thursday, Nov. 6, at the Statler-Hilton with President **Wright** in charge. Announcement was made of the talk to be given by **Harold Kahler** of Detroit to the Corrosion Engineers on Nov. 12. **George Marotta** presented **Dr. Henry Brown** of Udylite Corp., Detroit speaking on 'Corrosion Problems with Nickel and Chromium' illustrated by slides and blackboard sketches.

A general discussion disclosed how little we know about metals and the fact only one per cent of the atoms are anything other than hydrogen or helium. A general illustration of refining electrolytically led to discussion of the structure of metals and it was noted that we have but 12 common metals and still cannot plate all of them successfully. Atmospheric pollution and corrosion were discussed and it was clearly brought out that 'sandwich plating' had more effect than originally anticipated in preventing corrosion. Mention was made of the fact that figures indicate that London, noted for its fog, has 1000 tons of sulfuric acid per day from smoke and Detroit runs pretty high with 600 tons a day. Slides were used to show pitting, pores in deposits, different types of pitting patterns, use of high temperature

BRANCH SECRETARIES

Branch News is required of all Secretaries monthly by AES Bylaws. First of the month is Branch News deadline for next PLATING issue. Any items on hand on that date will be carried in that edition. Later arrivals will appear in the issue immediately following. In reporting talks given by speakers before the Branch, please give titles of the talks, the speakers' full identification and any other pertinent information of interest to other Branches and PLATING's broad readership.

chromium bath with a visible decrease in pitting, deposits of bright nickel and chromium, dull nickel and chromium, dull and bright nickel layers with chromium and nickel chromium plus a repeat of nickel and chromium. Discussion amplified these major points and showed how corrosion progressed or stopped with various changes in plating methods. Sample panels represented by the slides were shown and gave an exact visual check. After a lengthy discussion period, the meeting adjourned at 9:30 p.m.

George P. Swift
Secretary

BRIDGEPORT
Meyer Explains Preparation at Base Metals

The regularly scheduled meeting of the Bridgeport Branch was held in the main ballroom of the Hotel Barnum on Friday, Nov. 14. President **Michael Tamas** called the meeting to order at 8:15 p.m. Fifty-six members and guests were present.

Two active members were accepted and presented with membership certificates and pins.

Herman Braun reported that **Med Brassard,** past president, was seriously ill in the Norwalk Hospital.

Michael Tamas reported that the closeout meeting for the 19th New England Regional had been held on Oct. 16.

It was suggested that the Regional subscribe $100 to the National Society for a Sustaining Membership; subject to the unanimous approval of the Branches involved.

It was also suggested that members of our respective Branches in good standing for 20–25 years be remembered at the forthcoming 20th Regional. The Bridgeport Branch is responsible for the Educational program of the 20th New England Regional and welcomes suggested speakers and topics from the members.

Frank Kalafus reported that all plans had been finalized for the Christmas dinner dance and that a sellout is assured.

The intended subscription for a Sustaining Membership was questioned and, by majority vote, the Bridgeport representatives were instructed to vote against the proposal.

William Hyatt Jr. was the happy recipient of the door prize.

President Michael Tamas turned the meeting over to our librarian, **William Lindsay,** who in turn asked **Hubert Goldman** to introduce our featured speaker of the evening. Hubert briefly said that **Dr. Walter Meyer,** because of his efforts for the past twenty-odd years in behalf of all platers and associate chemists needed no further introduction to the assembly. Dr. Meyer then proceeded, with the aid of colored slides and blackboard descriptions, to explain the many pitfalls encountered in the correct preparation of base metals for plating. The importance of metallurgy in our techniques was stressed, together with the correct application of cleaning and pickling cycles. Hydrogen embrittlement, a very serious problem, was discussed and suggestions to overcome this phenomena were offered. Dr. Meyer received a standing vote of thanks for his excellent efforts.

Bob Parker
Secretary

BUFFALO
Empire State Regional Reports; Gore Speaks on Wire Plating

The November meeting of the Buffalo Branch was held on Friday, Nov. 7, at our regular meeting place, the Niagara Manor.

A major portion of the business session was devoted to reports of progress to date on the 5th Empire State Regional Meeting to be held April 11, 1959 at the Hotel Stuyvesant, Buffalo, N.Y. Committee reports were given by **Frank Rudolph** general chairman; **John Scholterer,** program chairman; **Robert Lienert,** publicity chairman and **Harold Shapiro,** educational chairman.

After the business session, **John Donaldson,** our librarian, introduced the speaker of the evening, **Robert T. Gore** of the Metal & Thermit Corp., whose subject was "Wire Plating." Mr. Gore discussed the general principles applying to wire plating, placing special emphasis on the differences in technique between continuous wire plating and conventional still tank plating. Application of metal coatings to wire such as tin, tin-lead, brass, bronze, copper, nickel and zinc was also discussed.

The February meeting will be held the first Friday of the month at the Niagara

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Manor. The speaker will be **Eliot Gessman** of Olin-Mathieson Chemical Corp., whose subject will be "Plating on Hard-to-Plate Base Materials".

CENTRAL MICHIGAN
Ruhly Presents Paper; Attendance Discussed

The Central Michigan Branch met on Tuesday evening, Nov. 4, at the Hotel Hayes in Jackson, Michigan. This was a combined dinner meeting and educational session.

Seventeen members gathered for dinner and then heard **King Ruhly** of the Michigan Chrome and Chemical Corporation speak on "Rack Coatings and Stop-off Lacquers." Mr. Ruhly's talk proved to be an interesting one covering not only the advantages of using coated racks but also the many and diverse uses of stop-off lacquers in the plating field.

A short discussion on possible ways or means to bring out greater attendance at future meetings followed the educational session.

Homer E. Welch
Second Vice President and Publicity Chairman

CHICAGO
Case Talks on Polishing; Four Speakers for Annual

The monthly meeting of the Chicago Branch was held at the Western Society of Engineers on Friday, Nov. 7, at 8 p.m. Six new members were elected to the Branch. An early reminder, the annual educational session and banquet will be held at the Conrad Hilton Hotel on Saturday, Jan. 31, 1959. Our librarian, **Joseph C. Corre,** and committee have arranged for the following to give talks: **Myron Diggin, Dr. M. M. Beckwith, C. H. Sample** and **Dr. R. B. Saltonstall.** The following subjects will be discussed (1) NICKEL ELECTROFORMING (2) DUPLEX NICKEL PLATING (3) PROTECTIVE VALUE OF NICKEL AND CHROMIUM IN BRIGHT DEPOSITS (4) MODERN BRIGHT NICKEL AS A FINISHING TOOL. The banquet committee, under the chairmanship of **Ray Ledford** and author, have arranged a good floor show for the members and guests.

Ray Ledford, Chemray Corp., introduced the speaker of the evening. The guest speaker was **Barney C. Case,** supervisor of finishing operations at the Sunbeam Corp. in Chicago, Illinois. Mr. Case is a graduate in chemical engineering of the University of Michigan. The bulk of his 24 years in metal finishing has been with Hanson-Van Winkle-Munning Co. in the Detroit area. Since coming to Chicago with Sunbeam, he has appeared as a speaker on various programs of the Electrochemical Society and the AES. Mr. Case spoke on "The Prefinishing of Thin-Gauge Metal."

Mr. Case discussed the methods that are used in flat-polishing lines; (1) the wet method and (2) the dry method. In the wet method, an emulsified oil is used over the belt and steel. Different grades of grit are used to accomplish the degree of finish in the dry method. The dry method has some advantages over the wet method; it is less expensive to run and less messy to operate. In setting up a flat polishing line, the following items must be thoroughly considered. (1) The width of strip to be processed (2) in single or double file (3) and the thickness of strip to be processed. At Sunbeam, the strip to be processed (1) is a special kiln steel (2) which has a hardness around 50 B and (3) a gauge thickness of 0.032.

The polishing consists of passing the metal strip, 35 ft/min, through seven heads of aluminum oxide (ranging from 100 to 220 Grade); then followed with three heads of lubricated silicon carbide (150 Grade). From 0.001 to 0.00125 of metal is removed during the polishing and the rms value ranges from 10–16. The depths of scratches are controlled to not more than 100 millionths of an inch. After polishing, the metal strip is processed through a phosphate line and then given

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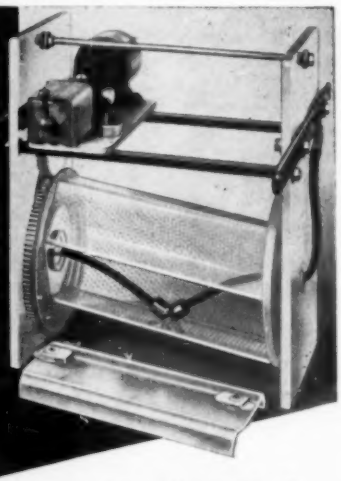
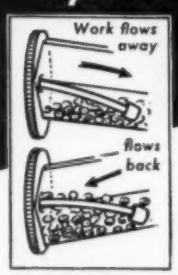

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a dry lubricant coat (soap) and finally dried. The phosphate coating acts like a sponge and holds the lubricant and aid in the drawing of the metal. The severity of the draw determines the kind of soap and thickness of soap film. To keep down the quantity of rejects, the dies must be highly polished and kept very clean.

After the drawing operation, (1) the parts are properly cleaned to remove the dried lubricant and phosphate coatings, (2) plated with WES-X copper using periodic-reverse current (3) followed by automatic buffing (4) and bright nickel and chrome plate. Mr. Case concluded his talk by saying that there is very much to be learned about flat polishing of thin-gauge metal.

A lively question and answer period followed and he was warmly thanked for his very informative talk.

Christopher Marzano
Publicity Chairman

CINCINNATI

Hart Talks on Trouble Shooting; Leonhardt Elected to Office

The Nov. 19 meeting was called to order by President **Helmich** with 31 members and guests present.

Earl Leonhardt was elected as second vice president to fulfill the vacancy created by the resignation of **Don Gusse.**

Roger Winterman reported that the 1959 Tri-State Annual Meeting will be held in Louisville, Kentucky, on Saturday, April 4, 1959.

Gerry Poll reported that plans for Ladies Night, which will be held on Tuesday, Dec. 9, have been completed.

The speaker for the evening was **John S. Hart,** of the Hanson-Van Winkle-Munning Co., who talked on "Trouble Shooting". Mr. Hart pointed out some unusual problems which he has dealt with in recent years. His discussion covered aluminum anodizing, cyanide copper, bright nickel and chrome plating. After a question and answer period the group adjourned to the social hour sponsored by Bill Young & Co., with **Bill Young** and **Dick Evans** as hosts.

David L. Kaplan
Secretary

CLEVELAND

Titanium Discussed by Minkler; Branch Meets in New Technical Building

Starting with the first fall meeting, the Cleveland Branch is meeting at the new Cleveland Technical Societies' Building. This beautiful building is a fitting tribute to the technical personnel of our community, and to the many and diversified industries which helped to support this venture.

W. Ward Minkler, manager of technical sales of Titanium Metal Corp. of America, gave a most interesting talk on the past, present, and future endeavors in the titanium metal field. Although not directly related to the electroplating field, there are many applications where this metal is finding useful applications in racks and anodizing fixtures.

Hank Sedusky, chairman of the banquet committee, announced that the annual education session and dinner dance would be held Jan. 31, 1959 at the Carter Hotel.

George A. Shepard
Assistant Librarian

DALLAS-FT. WORTH

Waste Disposal Presented; Film and Talk on Grinding

The Dallas-Ft. Worth Branch opened the 1958–1959 season with a very informative meeting, Wednesday, Sept. 24, in the Zodiac Room of the Lennox Hotel in Grand Prairie, Texas. The meeting was called to order by President **Myron E. Browning** with approximately 50 members and guests in attendance.

Six candidates for membership were accepted.

President Browning opened the discussion on enlarging the Branches interest to include the chemical milling of metals. The Dallas-Ft. Worth Branch represents

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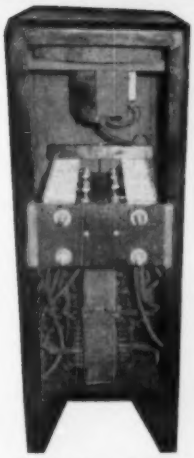

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five major aircraft and airframe component manufacturers who have reported amazing increases in the interest and application of chemical milling of metals. It was agreed to include the field of chemical milling and its associated finishing systems in the local sphere of interests.

A nominating committee of **Andy Larson, W. S. White, Clint Murray,** and **John R. Lane** was appointed to submit candidates for the office of vice president left vacant by the move of **James C. Cameron** to the West Coast area.

Secretary **A. C. Fricke** was called upon to read the financial report and membership status report.

T. E. "Ted" Betz, librarian, introduced the speakers for the evening. **H. J. Graeser,** superintendent of the Dallas Water Dept., and **C. H. Williams,** chief of water analysis, and representing Ft. Worth, **J. L. Robinson,** Ass't Superintendent of the Ft. Worth Water Department. Aspects of plating waste control and what it means to the cities were discussed. Each city's particular interests were discussed.

R. H. McDonald and **E. F. Casey** of the Behr-Manning Co. presented an enlightening movie and discussion on "Off-Hand" grinding and finishing techniques.

After the question and answer period, the group displayed their appreciation for all speakers.

A. C. Fricke
Secretary

DALLAS-FT. WORTH
Finishing of Magnesium Alloys Discussed by DeLong

The regularly scheduled monthly meeting was held in the Zodiac Room of the Lennox Hotel on Oct. 22. President **Myron Browning** called the meeting to order with approximately 30 members and guests present.

Elections were held for 1st and 2nd vice presidents with the following results: **J. L. "Red" Godfrey,** 1st vice president; **M. T. "Tommy" Norris,** 2nd vice president.

Four new candidates for membership were elected. **Ken Porter** led a welcoming show of applause for the new members.

Two new committees were appointed by President Browning for membership and entertainment. These were composed of the following:

Membership Committee—**Don Allie, Bill Aves, Tom Norris** and Entertainment Committee— **Glen Monroe, Tom Foy, John Lane.**

Librarian **Ted Betz** gave the group a run-down of speakers scheduled for future meetings.

Secretary **Fricke** presented our speaker's table guests **R. E. Pfaff** and **H. K. DeLong** of Dow Chemical Co. Mr. DeLong presented an excellent paper on finishing processes and techniques used on magnesium alloys. The ensuing discussion was capped with a detailed description and exhibition of specimens of Dow's new "electroless nickel" applied to various magnesium alloys.

A rousing display of appreciation and a motion for adjournment by **J. C. Bessonette** closed the meeting.

T. E. Betz
Librarian

DAYTON
Nominate Bauch for Merit Award; Dvorin on Ion Exchange

The Dayton Branch held its regular November meeting, November 19 at the Biltmore Hotel. Thirty-five members and guests were present.

One new member was elected.

Announcement was made that **Fred Bauch** of Dayton Branch is being nominated for the Award of Merit. Fred is a senior manufacturing research engineer at Frigidaire Div., GMC and has worked in electroplating and associated processes for almost his entire life and has made many contributions to this field.

Librarian, **L. Hadlock,** introduced Fred Bauch, the first speaker for the evening. He gave a short talk on "Problems in Barrel Plating".

The main speaker for the evening was **Robert Dvorin,** Graver Water Conditioning Co., New York, N.Y. His topic was "Ion Exchange in the Plating Room".

Refreshments after the meeting were through the courtesy of Globe Chemical Co., Dayton, Ohio and their representatives and Dayton Branch members, **Karl Jund** and **J. W. Stephens.**

R. M. Clinchens
Secretary

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ON THE PODIUM AT THE DETROIT ANNUAL EDUCATIONAL SESSION
(Left to right) National President Herberth E. Head, technical chairman of the December 5 meeting; Dr. A. Kenneth Graham, technical speaker; National Executive Secretary John P. Nichols, presenting AES historical paper; Donald M. Bigge, discussing the technical subject.

GRAND RAPIDS

Vandenberg Presents Paper on Aluminum Finishing; Membership Drive

The Grand Rapids Branch held the Nov. 14 meeting in the Trader's Room of Scotties Restaurant. The 71 members and guests present were served delicious beef dinners, followed by a brief business meeting. President **Paul Waalkes** talked briefly about the membership drive as an excellent means to commemorate the Golden Anniversary Year. Three new members were voted into the Society at the November meeting.

Librarian Orville Hoxie introduced the distinguished speaker of the evening, **Russel Vandenberg,** head of the New Finishes Division of the Aluminum Company of America. Mr. Vandenberg first reviewed the current finishing trends on aluminum and aluminum alloys. He then discussed modern methods of anodizing, showing some excellent slides diagraming the three basic structures of anodic coatings, and analyzing each in its method of formation and function. Mr. Vandenberg then discussed the mechanics of sealing the anodic coating, discussing the various types of seals and the importance of particle or grain size. Some excellent photomicrographs were shown, distinguishing the difference in alloy and coating density as related to corrosion resistance and brightness.

He discussed electropolishing and chemical polishing of aluminum, pointing out the necessity of removing surface inclusions and minor imperfections.

Finally, Mr. Vandenberg explained the characteristics of anodic coatings, and their specifications as related to their applications. He pointed out the great need for a common nomenclature system and explained the Aluminite system of surface specifications.

An excellent movie provided by Alcoa was then shown, very dramatically depicting present and potential future uses of anodized aluminum.

Interest in the subject was dramatized by an exceptionally lively question and answer period.

After adjournment, members enjoyed refreshments and interesting conversation.

Thomas C. Henner
Second Vice President

HARTFORD

Moeller Talks on Surface Protection of Metals

The regular Branch meeting was held at the Hotel Bond, Nov 17, and 41 members and guests were present. Preceding the meeting a movie in color entitled "Piercing the Unknown" was shown through the courtesy of the International Business Machines Co.

The guest speaker for the evening was **Ralph Moeller** of the Pratt and Whitney Aircraft Corp. whose subject was "Trends in Surface Protection of Metals."

Industrial uses of various materials for (1) In-process protection and (2) Final-product protection were briefly mentioned, such as: Oils, greases, protective papers with metals, strippable papers, hot wax melts, vapor phase inhibitors, plastisols, heat sealing materials, black oxides, aluminum paint for high temperature

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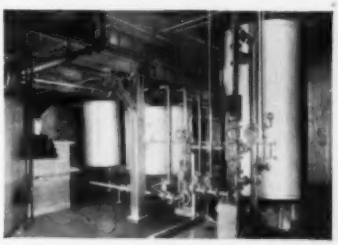

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protection, Martin hard coatings—a heavy or hard anodizing which is thicker than normal anodizing having a hardness approaching chrome plate used as a weight saver and for its wear resistant surface was described, and cadmium plating. For decorative and corrosion protection of parts the plating of chrome, brass, nickel and gold was mentioned as well as vacuum and vapor deposition; also briefly covered was the use of color anodizing and baked enamels. The prevention of steel cracking under stress with cadmium plate under high temperatures was mentioned by plating nickel first then cadmium.

The technical chairman for the evening was **Walter Acker.**

Stanley Platoz
Secretary

INDIANAPOLIS
Aluminum Anodizing Presented by Vandenberg

Fifty members and guests of the Indianapolis Branch met at Fox's Steakhouse on Nov. 3, 1958, for the monthly meeting. After the customary introductions the Branch librarian, **Paul Johnson,** introduced the speaker of the evening, **Russ Vandenberg** of the Aluminum Company of America, who spoke on Aluminum Anodizing.

In his talk, Mr. Vandenberg discussed and demonstrated the formation of the anodic coatings of aluminum, the solvent effect of the various electrolytes on the final coating and the effect of various alloying constituents on the color of the coating. Anodizing of aluminum can be decorative or functional, dependent upon the electrolyte, temperature, current density and time. The talk was illustrated by slides and the Alcoa movie on color and texture in aluminum finishes was shown. Following this, a question and answer period was held, and many questions were asked and answered.

John Hood, Branch president, then opened the business meeting. A new member was accepted by acclamation upon a motion by **Marshall Whitehurst** and seconded by **John Holland.**

Les Reynolds, senior branch representative to the Tri-State reported that a meeting of the Tri-State Committee is to be held in Louisville on Nov. 8, and that he would be in attendance. He stated that the Indianapolis Branch must elect a junior member to the Tri-State before the April 4 meeting of the Tri-State.

The dinner meeting time was changed to 7 p.m., instead of 6:30, to make it easier for the men who are working by standard time to attend.

The meeting adjourned at 10 p.m.

A. M. Howard
Secretary

LANCASTER
Frant Speaks on Salt Spray Testing

The regular meeting of the Lancaster Branch took place Nov. 14 at Aircraft Marine Research Laboratory, Harrisburg, with 26 members and two guests present.

During our business meeting, mimeographed copies of revisions and changes of the Society bylaws were distributed.

One new member was elected.

Our educational program consisted of an excellent talk on Salt Spray Testing of Copper Plated Parts, given by **Martin S. Frant,** research associate of Aircraft Marine Products, Harrisburg, Pa.

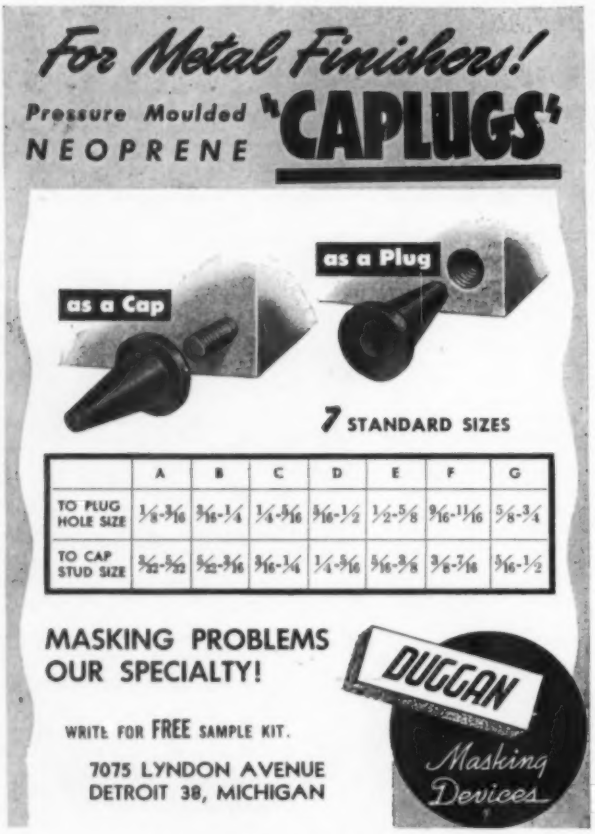
I. Paul Sharretts
Secretary

MILWAUKEE
Greenberg and Gohman Speak; Bylaws Change Approved

The 492nd regular meeting of the Milwaukee Branch was called to order by President **Frank Marshall** on Oct. 3, 1958 at the Ambassador Hotel.

A membership committee report was given by **C. Taterzynski** who stated that a goal had been set of 50 new members for the year and he asked all members to contact any new prospects.

Henry Bornitski reported that the new directory was in the process of being started and he announced that new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directory cards were to be filled out by the members present and the balance to be mailed.

The Sustaining Members Dinner is to be held on March 6, 1959 with a speaker booked for that date.

Bylaws: Section 5, Article V, was read and approved. This section reads as follows: The fiscal year of the Milwaukee Branch shall at all times be the same as the fiscal year of the American Electroplaters' Society, Inc.

An addition of Section 6, to Article IV was read as follows: In accordance with Article V, Section 5 of the Bylaws of the American Electroplaters' Society, Inc., the secretary-treasurer shall receive all funds of the Branch and deposit them as directed by the Board of Managers. He shall pay all bills properly presented for payment. He shall give receipts for all monies received and require vouchers or invoices for all monies paid. He shall keep books of account correctly posted and ready for audit at any time.

Six new members were voted into the Branch.

A minute of silence was held for the memory of **Raymond McGuire.** The meeting was then turned over to **Hilton Smith** who introduced **M. L. A. Greenberg** who spoke to the Inorganic Section on "Improved Plating Quality Through Low Cost Integrated Waste Treatment."

Ted Sobczynski introduced **Richard Gohman** who spoke to the Organic Section on "Filoform Rusting—Its Cause and Prevention in Organic Finishing."

Frederick F. Padgett
Secretary-Treasurer

MONTREAL

Golden Jubilee Dinner Dance

The first important fall social event among AES Branches was the recent Fourth Annual Dinner Dance held by the Montreal Branch as a phase of the Society's Golden Jubilee observance. The new Queen's Hotel was the scene of the occasion.

The memorable evening started with a Cocktail Party given by Canadian Hanson & Van Winkle Co., Ltd. Following the dinner, numerous door prizes were awarded to lucky ticket holders. The door prizes were contributed by members of the Montreal Branch and various plating industry suppliers in the Montreal area.

The enjoyable evening culminated with dancing until one a.m. to the orchestra of Stan Martin.

NEWARK

Brown and Theusen Present Informative Papers

The November meeting was held on the 21st with about 80 present. Four applications were received and four men were elected members.

A motion was made that the Bylaws as presented to the Branch in October be adopted. The motion passed. **Gus Bittrich** reported the Christmas Party

MONTREAL BRANCH DINNER DANCE A GOLDEN JUBILEE CELEBRATION

(TOP) Members of the various committees, left to right, seated, John T. Reisenburg Jr., Richard Takeuchi, Chairman John Serbeniuk, G. Ross Davidson. (Standing) Bruce B. Millward, Robert W. Niggemann, John Domoracki, John Rennie, James F. Saimoto, Anthony P. Copeland, Stanley Frost, F. Norbert Cronin. (CENTER) View of part of the Salon Dore of the Queens Hotel as members and guests were seated for dinner. (BOTTOM) Cocktail Party hosted by Canadian Hanson & Van Winkle Co., Ltd. In the foreground, left, John Serbeniuk, president, Montreal Branch, and G. Ross Davidson of Canadian Hanson & Van Winkle Co., general chairman of the AES's 44th Annual Convention, Montreal, 1957.

'all set' and urged all to attend. He also announced **George Reuter** was celebrating his sixtieth anniversary that day, and **Paul Oldam** his thirtieth as a member of the Branch. Don Foulke noted that **John Trumbour** had been honored by New York Branch by being made an Honorary Member and all three men received a healthy round of applause.

Librarian **Korbelak** then introduced **J. C. Brown** of the Westinghouse Lamp Works who discussed bulk bright dipping. He described the bright dip machine which had been used for 23 years to bright dip brass bases and stated that this machine had been so successful that a duplicate machine had been installed recently in Texas to do the same job. The processing steps were given in detail and the members were impressed with the fact that 2,000,000 pieces and more were bright dipped each day.

Paul Theusen of Metal Processing Co. spoke on Electroless Plating. He reviewed the history of electroless nickel which, from the standpoint of usefulness, began with Abner Brenner's work. He explained that ductility could be improved by stress heat treatment or by the use of stress reducers. The corrosion resistance was reported at least as good as electrodeposits and it showed no porosity at 0.0003 in. with the ferroxyl test. He also noted electroless nickel becomes passive with age.

The acid bath was recommended because it is faster and easier to control and does not yield heavy ammonia fumes, although the alkaline bath is brighter.

Paul then reviewed other metals which can be deposited (Co, Fe, V, Cu, Ag, Cr) and reported gold now being done commerically with the gold complex cyanide in acid solution producing 0.0001 in. one hour (less after one hour). This process is particularly good over electroless nickel.

Both speakers were barraged with a host of questions which demonstrated that the meeting was one of the best in recent years.

D. Gardner Foulke
Secretary

PITTSBURGH

Lux Talks on
Phosphate Coatings

The November meeting was held as usual at the Gateway Plaza. The Pittsburgh Branch has designated the second Wednesday of each month to be "meeting might."

The meeting was attended by 36, including nine guests.

Gerald A. Lux of Oakite Products, Inc., spoke on "Some Fundamentals of Phosphate Coatings." Mr. Lux is an exceptionally able speaker as was borne out by the keen attention exhibited by the members and guests. A lively discussion period followed the formal presentation.

Ed Keller
Secretary

ROCHESTER

Precious Metal Plating
Presented by Smith

The November meeting was held at the Rochester German Club. The meeting was called in order by President **Frank Beuckman.**

The Chairman of the Christmas party **"Tye" Moffatt** gave his report on the party to be held Dec. 6, 1958 at the Midvale Country Club; **Linwood Morrison** reported on the status of budget system being set up to control the finances of the Rochester Branch, and President Frank Beuckman reported on the program to increase membership in the Rochester Branch for the next fiscal year.

The speaker of the evening was introduced by Librarian **Ed Penczek. Frank K. Smith,** president of Technic, Inc., gave an extremely interesting talk on his practical and technical experiences in the field of precious metal deposition. In short many mental problems associated with gold and rhodium plating were solved during the evening.

Linwood P. Morrison
Secretary-Treasurer

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SAGINAW VALLEY

Plant Tour; Gompers Speaks on Safety

Because of the automative strikes, the October meeting was delayed until Oct. 23. This meeting was a tour of the Saginaw Steering Gear plant. The combination of pheasant season, bad weather, and meeting date uncertainty held attendance down to 42 members and guests. Our Branch extends its thanks to Saginaw Steering Gear for a very informative tour and the best Smorgasbord we have partaken of in some time.

The November meeting was held in Zehnder's Hotel on Wednesday, Nov. 12. President **Stew Harger** opened the meeting after a social period and a ham dinner. Forty-six members and guests were present, with one application for membership.

The door prize was donated by the Gravi-i-Flo Corp. which was represented by **E. N. Jarvis.** The lucky winner of the telescope was **L. R. Myers** of Chevrolet, Bay City.

Librarian **Art Medwedeff** introduced the speaker, **W. G. Gompers,** sales engineer, Mine Safety Appliances Co. whose subject was "Health Hazards and Safety in Plating Operations." After Mr. Gompers talk, the movie "The Air We Breathe" was shown. A question and answer period followed the movie.

Our next meeting will be Jan. 14, 1959, with **C. F. Ivins Jr.,** of Hanson-Van Winkle-Munning Co. talking on "D. C. Power for Electroplating and Anodizing."

In the meantime, we extend Season's Greetings to all.

George E. Savage
Recording Secretary

ST. JOSEPH VALLEY

Pettit Speaks on Aluminum Plating; Roth Reports on Regional

The October meeting of the St. Joseph Valley Branch was opened by President **Ray Dearth** at 6:30 p.m. President Dearth's first action was to appoint **Dr. H. J. Wiesner** as educational committee chairman with **Dr. E. J. Wilhelm, A. B. Matern** and **Lou Rague** to assist him.

Delegates appointed to the 1959 Convention as representatives of our Branch are: **Duke Wysong, Gene Roth, Henry Meers;** Alternates: H. J. Wiesner, **Ralph Brouwer,** Ray Dearth.

Six new members were voted on and accepted.

Gene Roth, our representative to the newly formed Midwest Regional Association, spoke on meetings held at the Cincinnati Convention. He explained the function and dues necessary for Branch participation. After a round robin of introductions, President Dearth turned the meeting over to the librarian, **Jack Petersen,** who introduced the speaker

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for the evening. **Ralph Pettit,** technical advisor of the Diversey Corp. His topic was "Plating on Aluminum".

After a brief history of aluminum production and early plating patents, Mr. Pettit spoke of the future demands on aluminum and finishes.

Pre-treatments for plating are extremely critical. The natural Al_2O_3 is extremely adherent and difficult to remove. Prior treatments must remove all foreign contaminants, remove the oxide film and replace it with a more uniform and stable film, and finally remove microconstituents and intermetallics.

The wide diversification of alloys require different treatments of modification of treatment to condition the surface of specific alloys. In general the treatment consists of a hot sulfuric acid etch, a double Z or deposit (sometimes triple) then follows. Spongy, thick or non-adherent coating are of course conducive to poor adhesion and performance of the plated film. Corrosion improvement is yet much dependent on plating thickness.

A large and varied number of questions were answered by Mr. Pettit after which he was accorded a standing round of applause for an interesting and very well presented paper. The meeting was adjourned at 10 p.m.

Henry A. Meers
Secretary

ST. LOUIS

Brown Discusses Corrosion Studies

The regular monthly meeting of the St. Louis Branch was held at the York Hotel, Nov. 12 with 26 people for dinner. The business session was called to order by our president, **William George,** with 34 members and guests present. A new member was accepted. The committee reports were omitted for this meeting. Librarian **Arthur Wrisberg** introduced **Dr. Henry Brown** of the Udylite Corp. who presented a talk on "Corrosion Studies with Nickel-Chromium Plate." His talk was accompanied by slides showing the effects of corrosion. He pointed out that there are three things that can extend corrosion resistance: (1) Thicker chromium deposits, (2) Dual chromium deposits and (3) layered nickel deposits. The talk was followed by an active question and answer period. Dr. Brown was given a rising vote of thanks for his excellent paper and the meeting adjourned at 9:30.

Ward Kelly
Secretary

SOUTHERN TIER

Corrosion Protection Discussed by Sidel

The Southern Tier Branch held their meeting at the Carlton Hotel, Binghamton, N.Y. with approximately 30 members and guests present.

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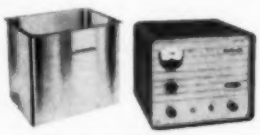
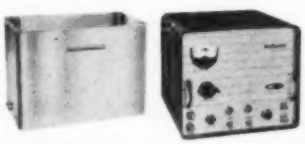
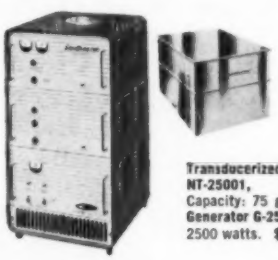


Transducerized Tank NT-1505, Capacity: 5 gallons; Generator G-1501, 200 watts. $695.



Transducerized Tank NT-5001, Capacity: 10 gallons; Generator G-5001, 500 watts: $1325.



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President **Morgan Rake** held a short business meeting including a report of the final arrangements of the Branch Christmas Party.

Librarian **Charles Emery** introduced the speaker of the evening Mr. **Sidel,** representing the Promat Div. of A. W. Poor & Co. Mr. Sidel spoke on the "Corrosion Protection of Chromated Zinc Products." With the use of colored slides, he pointed out very clearly what factors influence corrosion of chromated zinc plated products. The topic was well received and an interesting question and answer period followed the talk.

Our November meeting is to be held at the Langwell Hotel in Elmira. In place of the December meeting we plan to have a Christmas Party.

W. Rossiter
Secretary

SPRINGFIELD
Plating Solution Control Explained by Asquith

The Springfield Branch met on Monday, Nov. 24 at Blake's Restaurant.

Due to the absence of President **Edward F. Koetsch Jr.,** the meeting was conducted by 1st Vice President **Elery C. Gibson.** After the business session, **Arthur Zavarella** gave us one of his famous five-minute reviews. Art chose his subject from *Metal Finishing* magazine, of last September. He explained some of the plating problems of thermo shock resistance on the nose cone of the X17, quoting from the magazine article. The review met with much approving comment from the members.

Our technical speaker for the evening was our own **David J. Asquith,** chief metallurgist of Moore Drop Forging Co. Dave covered the subject of "Control of Plating Solutions" pretty thoroughly, and received a rising vote of acclaim on completing his talk. There were a number of questions which Dave answered. The speaker was introduced by Librarian **Al Salmond.**

Melvin P. Roske, chairman of the Activities Committee gave a brief report of the progress and advance sale of tickets for the 50th Anniversary Party and Ladies Night, which will be held at the Springfield Armory Officers' Club on Thursday, Dec. 4. From Mel's report, one heck of a good time should be enjoyed by all.

Henry L. Heissfeld
Secretary

SPRINGFIELD
Golden Jubilee Party and Ladies Night

The Springfield Branch celebrated Thursday, Dec. 4, with a Golden Jubilee Party and Ladies Night held at the Springfield Armory Officers' Club. The crowd pretty well filled up the hall, and a wonderful evening of fun was enjoyed by all.

As each of the couples arrived, the committee was on hand to present the ladies with a Christmas corsage. After a "getting acquainted social period," and in some cases getting reacquainted, everyone sat down to a well loaded table, prepared by **Jack Ryan** of the Officers' Club. It was "dig in and eat." And it was delicious!

After tables were cleared, **Mel Roske** made a few announcements and asked all the ladies present to line-up for a grab bag. The many novelties caused plenty of laughter. **Elery Gibson** drew tickets for the door prizes. **Mrs. Frank Schulz** won the grand prize—a portable mixer. Several of the ladies received boxes of chocolates. **Walt Dyber** asked everyone to line-up for free ball point pens.

Bill Glenny and his orchestra played for the dancing.

Many thanks go to **Colonel Charles E. Septfonds,** of the Springfield Armory

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GOLDEN JUBILEE FESTIVITIES AT SPRINGFIELD BRANCH

(UPPER LEFT) All names left to right, Springfield Branch officers and wives, Mr. and Mrs. Elery C. Gibson, Mrs. and Mr. Edward F. Koetsch Jr., Mr. and Mrs. Alexander R. Salmond, Mr. and Mrs. Henry Heissfeld. Mr. and Mrs. George H. Mongeau departed for home before picture was taken. (UPPER RIGHT) Activities Committee members and wives. Mrs. Wayne B. Sanders, Mr. and Mrs. Ernest P. Donaruma, Mrs. and Mr. Martin J. Murray, Mrs. and Mr. Melvin P. Roske, Mrs. and Mr. Elery C. Gibson, Mrs. and Mr. Alexander R. Salmond, and Colonel Charles E. Septfonds, acting commanding officer of the Springfield Armory, to whom the Branch is grateful for the use of the Officers' Club. (LOWER LEFT) The Activities Committee, Martin J. Murray, Alexander R. Salmond, Wayne B. Sanders, Ernest P. Donaruma, Elery C. Gibson, Chairman Melvin P. Roske. (LOWER RIGHT) A few of the happy couples enjoying the dancing.

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who made the Officers' Club available to the Springfield Branch, to **Lovell Millett** who was good enough to take the pictures for us,—and to Jack Ryan of the Officers' Club, who took care of the dinner. They've all been swell.

And the members of the Activities Committee, who did such a wonderful job to make this night a grand success are: **Alexander R. Salmond, Martin J. Murray,** Elery C. Gibson, **Ernest P. Donaruma, Wayne B. Sanders** and Chairman Melvin P. Roske.

And even with the inclement weather, there were many friends and guests from out of town.

Henry L. Heissfeld
Secretary

TORONTO

Gore Presents Paper;
Organic Finishing Interest Heard

The Toronto Branch met in the Royal York Hotel, Nov. 14, 1958. Twenty-one sat down to dinner, 36 attended the meeting. **Bob Edwards** was absent; the chair was very well taken by **Pat Patterson. John Harden** reported **Bernie Stratton** is convalesing at home after his recent illness.

Ernie Hutt is progressing favorably and is back on the job. **J. Edwards** of the Hamilton Branch spoke on their introduction of Organic Finishing at their meetings with a definite increase in attendance as a result.

Robert T. Gore, of Metal and Thermit Corp., New York, spoke on "Tin Alloy Plating." The subject was well presented. A lively question period followed which was very enlightening. Well done Bob and "will ye no come back again." The speaker was thanked by **Charlie Reed.** Meeting adjourned at 10 o'clock.

A. W. Wilson
Librarian

WATERBURY

N.E. Regional Host;
Saltonstall Talks on Corrosion Resistance

The November meeting of the Waterbury Branch was held as usual at the Roger Smith Elton Hotel on Thursday, Nov. 13. Several topics of general interest to the Branch were discussed and announcement was made of a pending business meeting be held at the hotel to encourage gre ter attendence.

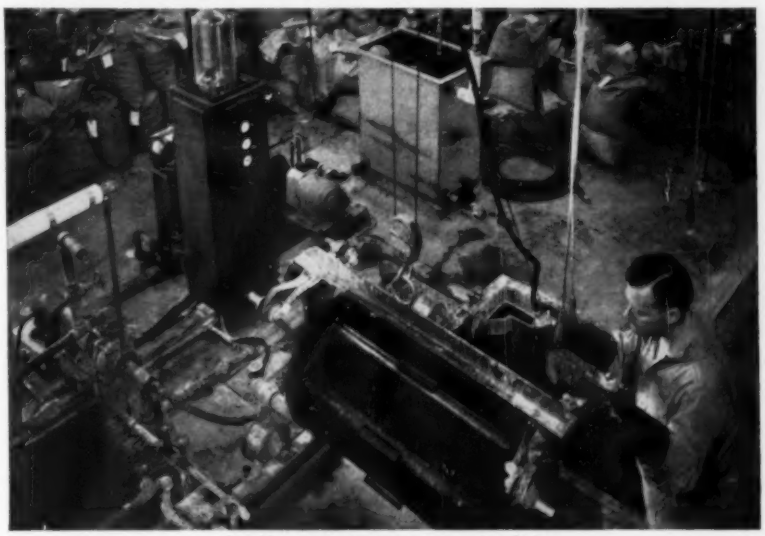
Technical Chairman **Bill Innes** introduced the speaker **Dr. R. B. Saltonstall.** Dr. Saltonstall proceeded to deliver a very fine paper on the factors affecting corrosion resistance of copper, nickel and chrome systems. He showed data indicating the necessity of better control of chrome plating thickness and conditions of application for maximum corrosion resistance when all other factors are equal. His work showed definitely that chrome deposited to a thickness of 0.000080 from a chrome bath at 130F was many times superior to that deposited from a conventional bath. His data also showed that the ratio of the sulfate to chrome was an important factor in subsequent corrosion resistance.

Waterbury Branch is the Host Branch for the coming New England Regional with our **Ed Garland** the general chairman. Plans are already being laid for this meeting to be held April 18, 1959.

The Waterbury Branch voted to subscribe $20.00 as its share of a Sustaining Membership to be bought in the name of the 19th New England Regional Meeting.

The next meeting will be at the Roger Smith Hotel in December.

F. A. Schneiders
Publicity



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Baltimore-Washington: G. C. Pierpont
Blue Ridge: J. J. Cherry, W. J. Miller III
Boston: E T. Baker, C. R. DeBenedict, S. Dakesian, J. P. Levy, J. L. O'Harn, T. F. Perkins Jr., R. C. Petit, A. I. Shaw, L. E. Singfield, D. A. Teoli
Bridgeport: J. Bourdeau, R. Mangiante
Chicago: M. L. Drake, F. J. Kolar Jr., C. K. McMillen, H. W. Singer, R. A. Waits, R. Zielinski
Cincinnati: J. DeLuca
Dayton: H. R. Knaggs
Detroit: A. J. Ginier, A. H. Holden, A. Luczki, R. M. Stevenson
Grand Rapids: G. A. Fournier, C. E. Stewart, T. F. Rademacher
Indianapolis: R. M. Branagin, A. Darnell, T. C. O'Nan
Lancaster: M. S. Frant
Los Angeles: H. Zagorin
Milwaukee: G. V. Fridel, H. F. McClellan, F. C. Musch
Montreal: V. Attila, W. F. Frewen, R. Paradis
Newark: J. Comandini, R. Greiff, U. F. Marx, D. N. Muklen
New York: J. J. Brickett, T. J. Harkins
Philadelphia: W. T. Duncan Jr., J. Weizer
Saginaw Valley: J. J. Manzella
St. Joseph Valley: C. W. Beekman, J. W. Poxivilko, H. Rohdy, T. D. Shafer Jr., R. K. Tucker, L. J. White
St. Louis: W. Gregory
San Francisco: J. E. Adams, F. B. Axelrod, J. T. Hatcher, R. L. Mitchem
Southeastern: H. Pink, E. W. Samoden, A. A. Towers
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Member or non-member authors of technical and scientific papers on electroplating, metal finishing and related arts are cordially invited to submit manuscripts of original, unpublished papers to the Editor of PLATING for review and publishing consideration.

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ELECTROPLATING ENGINEER—Graduate chemist age 44; 22 years diversified experience. Extensive background in all phases of metal finishing, surface treatments, and corrosion problems. Equipment design, process control, research and development. Seeks responsible position in Metropolitan New York City area. Reply to Box J1, PLATING, 445 Broad St., Newark 2, N. J.

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CHEMICAL ENGINEER—Ten years experience in all phases of electroplating including trouble shooting, research, and control. Extensive experience with copper, bronze, silver (high speed and conventional), lead-tin, chrome, cadmium, electroless and electrolytic nickel, conversion coatings. Diversified experience in material testing (organic and inorganic coatings, processes, and chemical). Familiar with various heat treating cycles. Directed activities of large Production Control laboratory. Will consider sales, technical service, or supervisory position. Reply to Box J3, PLATING, 445 Broad St., Newark 2, N. J.

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January 30, 1959—**Research Committee,** Conrad Hilton Hotel, Chicago, Ill.

January 31, 1959—**Chicago Branch,** Golden Jubilee Educational Session and Banquet, Conrad Hilton Hotel, Chicago, Ill.

January 31, 1959—**Cleveland Branch,** Annual Educational Session and Dinner-Dance, Hotel Carter, Cleveland, Ohio.

February 7, 1959—**New York Branch,** Fiftieth Anniversary Educational Session and Banquet, Hotel Statler Hilton, New York, N. Y.

February 13–14, 1959—**Dixie Regional Group,** Golden Jubilee Educational Session and Banquet, Southeastern Host Branch, Dinkler Plaza Hotel, Atlanta, Ga.

February 13–15, 1959—**Executive Board,** Dinkler Plaza Hotel, Atlanta, Ga.

February 14, 1959—**Sixth Interim Meeting,** Dixie Regional Group Sponsor, Southeastern Host Branch, Dinkler Plaza Hotel, Atlanta, Ga.

March 7, 1959—**Rockford Branch,** Annual Educational Session and Banquet, Faust Hotel, Rockford, Ill.

March 7, 1959—**Dayton Branch,** 13th Annual Meeting and Dinner-Dance, Dayton, Ohio.

March 20, 1959—**Editorial Board,** National Headquarters, Newark, N. J.

March 21, 1959—**Los Angeles Branch,** Annual Educational Session and Banquet, Beverly-Hilton Hotel, Los Angeles, Calif.

April 4, 1959—**Fifth Tri-State Regional,** Louisville Host Branch, Louisville, Ky.

April 11, 1959—**Baltimore-Washington Branch,** Golden Jubilee Banquet and Dance, and "Order of Past Presidents" Award Ceremony, Washington, D. C

April 11, 1959—**Empire State Regional,** Buffalo Host Branch, Hotel Peter Stuyvesant, Buffalo, N. Y.

April 18, 1959—**Twentieth New England Regional,** Waterbury Host Branch, Hotel Statler, Hartford, Conn.

April 25, 1959—**Milwaukee Branch,** Annual Meeting and Banquet, Schroeder Hotel, Milwaukee, Wis.

May 2, 1959—**Boston Branch,** 23rd Annual Technical Session and Banquet, Hotel Statler, Boston, Mass.

June 15–19, 1959—**Golden Jubilee Convention and International Exposition, Including Fifth International Conference on Electrodeposition and Metal Finishing,** Convention Headquarters—Hotels Statler Hilton and Sheraton-Cadillac, Exposition—Artillery Armory, Detroit, Mich.

January 15–16, 1960—**2nd Annual Dixie Regional Technical Session,** Saxony Hotel, Miami Beach, Florida. Sponsored by Miami Branch with Blue Ridge and Southeastern participating.

July 10–14, 1960—**47th AES Annual Convention,** Hotel Statler, Los Angeles, Calif.

June 18–23, 1961—**48th AES Annual Convention,** Hotel Statler, Boston, Mass.

June 25–28, 1962—**49th AES Annual Convention,** Schroeder Hotel, Milwaukee, Wis. Sponsorship Midwest Regional Council.

June 24–27, 1963—**50th AES Annual Convention,** Ambassador Hotel, Atlantic City, N. J. Sponsorship Newark Branch.

INTERSOCIETY

January 27–30, 1959—**Society of Plastics Engineers,** 15th Annual Technical Conference, Hotel Commodore, New York, N.Y.

January 31, 1959—**Chicago Electro-Platers Institute,** Management Seminar, in cooperation with the National Assn. of Metal Finishers, Conrad Hilton Hotel, Chicago, Illinois.

February 2–6, 1959—**American Society for Testing Materials,** Committee Week, Penn-Sheraton Hotel, Pittsburgh, Pa.

March 5, 1959—**National Assn. of Metal Finishers,** Board of Directors Meeting, Hotel Statler, St. Louis, Missouri.

March 5, 1959—**St. Louis Platers' Assn.,** Membership Rally, Hotel Statler, St. Louis, Mo.

March 16–20, 1959—**11th Western Metal Exposition and Congress,** American Society for Metals and other technical groups, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles, Calif.

March 17–19, 1959—**National Association of Corrosion Engineers,** 15th Annual Conference and Exhibition, Hotel Sherman, Chicago, Ill.

May 3–7, 1959—**The Electrochemical Society,** Spring Meeting, Sheraton Hotel, Philadelphia, Pa.

May 7, 1959—**Society of Plastic Engineers,** Regional Technical Conference. "Plastics and the Metals Industry," Penn-Sheraton Hotel, Pittsburgh, Pa.

May 16, 1959—**Masters' Electro-Plating Association of New York,** 41st Annual Banquet, Hotel Plaza, New York, N. Y.

FUTURE MEETINGS

(Continued)

June 14–16, 1959—National Assn. of Metal Finishers, Annual Membership Meeting, Hotel Statler-Hilton, Detroit, Michigan.

June 15–16, 1959—National Association of Metal Finishers, Management Seminar, Hotel Statler-Hilton, Detroit, Michigan.

June 21–26, 1959—American Society for Testing Materials, 62nd Annual Meeting, Hotel Chalfonte-Haddon Hall, Atlantic City, N. J.

May 18–20, 1959—Instrument Society of America, 5th National Symposium on Instrumental Methods of Analysis, Shamrock-Hilton Hotel, Houston, Texas.

September 21–25, 1959—Instrument Society of America, 14th Annual Instrument-Automation Conference and Exhibit, International Amphitheater, Chicago, Ill.

October 11–16, 1959—American Society for Testing Materials, Pacific Area National Meeting (with Exhibit), Sheraton-Palace Hotel, San Francisco, Calif.

October 18–22, 1959—The Electrochemical Society, Fall Meeting, Deshler-Hilton Hotel, Columbus, Ohio.

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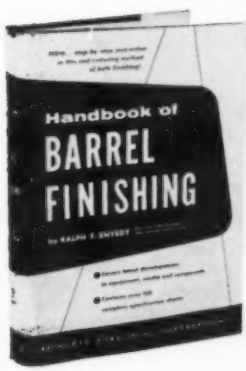

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(As of December 1, 1958)

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Time: 6:00 P. M.
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1109 W. Union Blvd., Bethlehem, Pa.
Meeting Place: Scotty's Anchorage, Emmaus, Pa.
Day of Month: Fourth Thursday
Time: Dinner 7:30 P.M.
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448 Munson Hill Road, Falls Church, Virginia
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and
Stafford Hotel, Baltimore, Md.
Day of Month: Second Tuesday
Time: 8:00 P.M.
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Atlas Powder Co., Wilmington 99, Del.
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Day of Month: First Friday
Time: 6:30 P.M.

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53 Galen St., Watertown 72, Mass.
Meeting Place: Hotel Statler, Boston, Mass.
Day of Month: First Thursday
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Secretary: Nelson Sheppard
No. 4, 2720 Lonsdale Ave. No. Vancouver, B. C.
Meeting Place: White Spot Barbecue, 25 & Cambie St.
Vancouver, B. C.
Day of Month: Mid-Month
Time: 6:00 P.M.

*Numbers after names of Sustaining Members indicate number of memberships supported.

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Secretary: Robert E. Lienert
44 Fanser St., Kenmore, N. Y.
Meeting Place: Niagara Manor, Niagara Falls, N. Y.
Day of Month: 1st Friday
Time: 6:30 P.M. Dinner—Meeting 8:00 P.M.
Sustaining Members:
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Secretary: William R. Allison
237 Gifford Road, Schenectady, N. Y.
Meeting Place: Hot Shoppe, Albany, N.Y.
Day of Month: First Monday
Time: 7:00 P.M.
Sustaining Members: None

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Secretary-Treasurer: R. W. Boos
2400 E. Mt. Hope, Okemus, Michigan
Meeting Place: Roosevelt Hotel, Lansing, Mich.
and
Hayes Hotel, Jackson, Mich.
Day of Month: First Tuesday
Time: 7:00 P.M. (Dinner Meeting)
Sustaining Members:
None

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Secretary-Treasurer: Paul Glab
882 N. Paulina St., Chicago 22, Ill.
Meeting Place: The Western Society of Engineers, 84 E. Randolph St., Chicago, Ill.
Day of Month: First Friday
Time: Dinner 6:15—Meeting 7:15

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817 Sabino Court, Cincinnati 31, Ohio
Meeting Place: Engineering Society Headquarters, Cincinnati
Day of Month: Fourth Wednesday
Time: Dinner 6:30 P.M.—Meeting 7:30 P.M.

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Meeting Place: Cleveland Technical Societies' Building
Day of Month: First Friday
Time: 8:00 P.M.

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The McGean Chemical Co., Cleveland 9, Ohio
Pittsburgh Steel Co., Thomas Strip Div., Warren 14, Ohio
Platers Supply Co., Cleveland 14, Ohio
Republic Steel Corp., Cleveland, Ohio
Rockwell Spring & Axle Co., Newton Falls, Ohio
Smoothex, Inc., Cleveland, Ohio
Talon, Inc., Meadville, Pa.
True Temper Corporation

COLUMBUS

Secretary: Halvor Christianson
2593 Andover Rd., Columbus 21, Ohio
Meeting Place: Battelle Memorial Institute, Columbus, Ohio
Day of Month: First Friday
Time: 8:00 P.M.

Sustaining Members:
None

DALLAS-FORT WORTH

Secretary-Treasurer: A. C. Fricke
212 Julian St., Dallas 3, Texas
Meeting Place: Lennox Hotel, Grand Prairie, Texas
Day of Month: Third Wednesday
Time: 6:30 P.M.—Dinner—8:00 P.M.—Meeting

Sustaining Members:
Lane Plating Works, Dallas, Texas

DAYTON

Secretary: Richard M. Clinehens
3206 Harwood St., Dayton 20, Ohio
Meeting Place: Hotel Dayton-Biltmore, Dayton, Ohio
Day of Month: Third Wednesday
Time: 8:00 P.M.

Sustaining Members:
Dayton Rust Proof Co., Dayton, Ohio
National Cash Register Co., Dayton, Ohio
Rack Processing Co., Dayton 9, Ohio
Rawac Plating Co., Springfield, Ohio

DETROIT

Secretary-Treasurer: Edward J. Kubis
Wyandotte Chemicals Corp., Wyandotte, Mich.
Meeting Place: Hotel Statler, Detroit, Mich.
Day of Month: First Friday
Time: 8:00 P.M.

Sustaining Members:
Auto City Plating Co., Detroit 17, Mich.
Automotive Rubber Co., Detroit 28, Mich.
Bruce Products Corp., Howell, Mich.
Buckingham Products Co., Detroit 27, Mich.
Chrysler Corp. (2), Detroit, Mich.
Congress Die Casting Co., Detroit 34, Mich.
Ford Motor Co. (5), Dearborn, Mich.
Formax Manufacturing Co., Detroit, Mich.
General Motors Corporation, Research Staff (5), Detroit 2, Mich.
Grand Steel & Mfg. Co., Clawson, Mich.
Higgins Rack Coating & Mfg. Co., Hazel Park, Mich.
Hoover Ball & Bearing Co., Adrian, Mich.
Houdaille Industries, Inc. (3), Detroit, Mich.
Howard Plating Industries, Inc., Royal Oak, Mich.
Kaybar, Inc., Birmingham, Mich.
Knight Plating Co., Detroit 7, Mich.
Lyon, Inc., Detroit 28, Mich.
R. C. Mahoney, Detroit 11, Mich.
Metal Mouldings Corp., Detroit 28, Mich.
Metal Plating Corp., Oak Park, Mich.
Metal & Thermit Corp., New York, N. Y.
Midwest Chrome Process Co., Detroit 9, Mich.
George L. Nankervis Co., Detroit 27, Mich.
Nelson Chemicals Co., Detroit 27, Mich.
Northwest Chemical Co., Detroit 4, Mich.
Oakman Manufacturing Co., Van Dyke, Mich.
Plating Inst. of Michigan, Lincoln Park, Mich.
Reed Plating Company, Detroit 11, Mich.
Reilly Plating Company, Melvindale, Mich.
J. J. Siefen Co., Detroit 9, Mich.
Siefen Compounds, Inc., Detroit 38, Mich.
Solventol Chemical Products, Inc., Detroit 3, Mich
Frederic B. Stevens, Inc. (2), Detroit 16, Mich
Superior Polishing Company, Van Dyke, Mich.
The Udylite Corp. (3), Detroit 11, Mich.
United Platers, Inc., Detroit, Mich.
Univertical Foundry & Machine Co., Detroit, Mich.
A. T. Wagner Co., Detroit, Mich.
Wagner Brothers, Inc., Detroit 3, Mich.
Whitfield Chemical Co., Detroit, Mich.
Wyandotte Chemicals Corp., Wyandotte, Mich.

GRAND RAPIDS

Secretary: Edwin Krook
1008 S. Ottilia St., S. E., Grand Rapids, Mich.
Meeting Place: Scotties Restaurant-"Trader Room"
Day of Month: Second Friday
Time: 7:00 P.M.

Sustaining Members:
Dexter Industries, Inc., Grand Rapids 2, Mich.
Doehler-Jarvis Corp., Grand Rapids, Mich.
Expert Coating Co., Grand Rapids, Mich.
Grand Rapids Plating Co., Inc., Grand Rapids 5, Mich.
Grand Rapids Brass Co., Grand Rapids, Mich.
Hammond Machinery Builders, Inc., Kalamazoo, Mich.
Hanson-Van Winkle-Munning Co., J. C. Miller Div., Grand Rapids, Mich.
Haviland Products Co., Grand Rapids, Mich.
Jervis Corp., Grandville, Mich.
Keeler Brass Co., Grand Rapids, Mich.
Knape & Vogt Mfg. Co., Grand Rapids, Mich.
Precision Castings Company of Michigan, Kalamazoo, Mich.
Preston Products Co., Grand Rapids 4, Mich.
Roto-Finish Company, Kalamazoo, Mich.

HAMILTON

Secretary: C. Ross MacLeod
40 W. 3rd St., Hamilton, Ontario, Canada
Meeting Place: Scotties Restaurant-"Trader Room"
Day of Month: Third Friday
Time: 8:15 P.M.

Sustaining Members:
Behr-Manning, Ltd., Brantford, Canada
Westinghouse Corporation of Canada, Ltd., Hamilton, Ontario, Canada

HARTFORD

Secretary: Stanley Platoz
26 Erwin Place, New Britain, Conn.

Meeting Place: Hotel Bond, Hartford, Conn.

Day of Month: Third Monday
Time: 7:45 P.M.

Sustaining Members:
Arrow Hart & Hegeman Electric Company, Hartford 6, Conn.
W. D. MacDermid Chemical Co., Bristol, Conn.
Royal Typewriter Company, Hartford, Conn.

HOUSTON

Secretary-Treasurer: N. C. Van Wagner
Box 4008, Houston 2, Tex.

Meeting Place: Sonny Looks Cafe

Day of Month: Third Tuesday
Time: 6:30 P.M.

Sustaining Member:
Dixie Electro Plating Company, Houston 3, Texas

INDIANAPOLIS

Secretary: Addison Howard
169 N. Indiana, Mooresville, Indiana

Meeting Place: Fox's Steak House, 1207 E. Washington St., Indianapolis, Ind.

Day of Month: First Monday
Time: Dinner 6:30—Meeting 8:00 P.M.

Sustaining Members:
Arvin Industries, Inc., Columbus, Ind.
P. R. Mallory & Co., Indianapolis, Ind.

KANSAS CITY

Secretary: Robert L. Garrett
3828 E. 9th Ter., Kansas City 27, Mo.

Meeting Place: Berkshire Hotel

Day of Month: The Thursday following the Second Wednesday
Time: Dinner 7:00 P.M.—Meeting 8:00 P.M.

Sustaining Members:
None

LANCASTER

Secretary-Treasurer: I. Paul Sharrets
704 Barbara St., Newcumberland, Pa.

Meeting Place: Varies

Day of Month: Second Friday
Time: 8:00 P.M.

Sustaining Members: None

LOS ANGELES

Secretary: Don Baudrand
791 E. 15th St., Los Angeles 21, Calif.

Meeting Place: Roger Young Auditorium, 926 W. Washington Blvd., Los Angeles, Calif.

Day of Month: Second Wednesday
Time: 8:00 P.M.

Sustaining Members:
Alert Supply Company, Los Angeles 22, Calif.
Associated Plating Co., Los Angeles, Calif.
The Barber-Webb Co., Inc., Los Angeles 58, Calif.
L. H. Butcher Co., Los Angeles 23, Calif.
Crown City Plating Co., El Monte, Calif.
Hall Mack Company, Los Angeles 7, Calif.
Mefford Chemical Co., Los Angeles 22, Calif.
Modern Plating Co., Los Angeles, Calif.
George E. Nichols Plating, Los Angeles, Calif.
Price Pfister Brass Mfg. Co., Los Angeles 31, Calif.
Rheem Automotive Co., Fullerton, Calif.
Standard Nickel-Chromium Plating Co., Los Angeles, Calif.
Surface Alloys Engineering Co., Huntington Park, Calif.
Turco Products, Inc., Los Angeles 54, Calif.

LOUISVILLE

Secretary-Treasurer: Harold G. Peters
2206 Sherwood Avenue, Louisville 5, Kentucky

Meeting Place: Hasenours Dining & Cocktail Lounge, 1028 Barrett Ave., Louisville, Kentucky

Day of Month: Third Thursday
Time: Dinner 6:30 P.M.—Meeting 8:00 P.M.

Sustaining Members:
American-Standard, Louisville, Ky.

MELBOURNE

Honorary Secretary: I. W. Rose
41 Glen Orme Ave., Orme S.E. 14, Australia

Secretary: P. Major
c/o Glen Walker & Co. Pty., Ltd., 11 Waterloo St., Carlton, Australia

Meeting Place: Metallurgy Theatre, Royal Melbourne Tech. College

Day of Month: Third Thursday
Time: 7:30 P.M.

Sustaining Members:
None

MIAMI

Secretary: Frank X. Marinello
5875 E. Fifth Ave., Hialeah, Florida

Meeting Place: Jerry's Restaurant, Lejuene Road, Miami, Fla.

Day of Month: Third Wednesday
Time: 7:00 P.M.

Sustaining Members:
None

MILWAUKEE

Secretary-Treasurer: Frederick F. Padgett
4510 N. 22nd St., Milwaukee 9, Wis.

Meeting Place: Ambassador Hotel, Milwaukee, Wisc.

Day of Month: First Friday
Time: 8:00 P.M.

Sustaining Members:
Acme Galvanizing, Inc., Milwaukee 15, Wisc.
Allen Bradley Co., Milwaukee 4, Wisc.
Cutler-Hammer, Inc., Milwaukee, Wisc.
Donald Sales & Mfg. Co., Milwaukee 13, Wisc.
Kohler Co., Kohler, Wisc.
Milwaukee Plating Co., Milwaukee 12, Wisc.
John Oster Mfg. Co., Milwaukee 17, Wisc.
Parker Pen Co., Janesville, Wisc.
Racine Plating Co., Inc., Racine, Wisc.
Square D Company, Milwaukee 12, Wisc.
S. K. Williams Co., Milwaukee 10, Wisc.

MISSISSIPPI VALLEY

Secretary-Treasurer: John L. Hartman
623 W. 31st St., Davenport, Iowa

Meeting Place: Moline American Legion, Moline, Ill.

Day of Month: Third Wednesday
Time: 8:00 P.M.

Sustaining Members:
Victor Casket Hardware Co., Galesburg, Ill.

MOHAWK VALLEY

Secretary-Treasurer: Carl Fenner
27 South Fifth Avenue, Ilion, N. Y.

Meeting Place: Thompson's Hotel, Yorkville, N. Y.

Day of Month: Second Thursday
Time: Dinner 6:30 P.M.—Meeting 8:00 P.M.

Sustaining Members:
None

MONTREAL

Secretary-Treasurer: R. W. Niggeman
4448 Beaconsfield Avenue, Montreal 28, Quebec, Canada

Meeting Place: Mount Royal Hotel, 1455 Peel St., Montreal, P. Q.

Day of Month: First Monday
Time: 8:30 P.M.

Sustaining Members:
Alloycraft, Ltd., Westmont, Montreal, Canada
Northern Electric Co., Ltd. Montreal, Quebec, Canada

NEWARK

Secretary: D. Gardner Foulke
455 Johnston Drive, Watchung, RFD 3, Plainfield, N. J.

Meeting Place: Robert Treat Hotel

Day of Month: Third Friday
Time: 8:15 P.M.

Sustaining Members:

American Smelting & Refining Co., South Plainfield, N. J.
Bell Telephone Laboratories, Murray Hill, N. J.
Corona Corp., Jersey City, N. J.
Frederick Gumm Chemical Co., Kearny, N. J.
Hanson-Van Winkle-Munning Co. (3), Matawan, N. J.
Hy Grade Electro Plating Co., Newark 7, N. J.
International Nickel Company, Inc. (2), Bayonne, N.J.
Maas & Waldstein Co., Newark 4, N. J.
Royal Plating & Polishing Co., Inc., Newark 4, N. J.
Sel-Rex Corporation, Nutley 10, N. J.

NEW HAVEN

Secretary-Treasurer: Bernard J. Gaffney
40 Filbert St., Hamden, Conn.

Meeting Place: Mason Laboratory—Yale University

Day of Month: Second Tuesday
Time: 8:00 P.M.

Sustaining Members:

Christie Plating Company, Groton, Conn.
Chromium Process Co., Shelton, Conn.
Enthone, Inc., New Haven 2, Conn.
Lycoming Div., AVCO Mfg. Corp., Stratford, Conn.

NEW YORK

Secretary-Treasurer: Milton Nadel
9-05 162nd St., Whitestone 57, N. Y.

Meeting Place: Hotel Statler

Day of Month: Second and Fourth Fridays
Time: 8:00 P.M.

Sustaining Members:

Allied Chemical Corp., Solvay Process Div., New York 16, N. Y.
Allied Chemical Corp., National Aniline Div., New York 6, N. Y.
American Zinc Institute, New York, N. Y.
Finishing Publications, Inc., Westwood, N. J.
International Nickel Company, Inc. (3), New York, N. Y.
Lea-Ronal, Inc., Jamaica 35, N. Y.
Levco Metal Finishers, Inc., Long Island City 1, N. Y.
Magnuson Products Corp., Brooklyn 2, N. Y.
Metal & Thermit Corp., New York 17, N. Y.
Oakite Products, Inc., New York 6, N. Y.
Photocircuits Corporation, Glen Cove, N. Y.
Sylvania Electric Products, Inc., Flushing, N. Y.

PHILADELPHIA

Secretary: I. William Marcovitch
1302 St. Vincent St., Philadelphia 11, Pa.

Meeting Place: Engineers' Club of Philadelphia, 1317 Spruce St., Philadelphia 7, Pa.

Day of Month: Fourth Monday
Time: 8:00 P.M.

Sustaining Members:

Accurate Electro-Plating, Inc., Philadelphia, Pa.
Aetna Electroplating Co., Inc., Philadelphia 11, Pa.
Amchem Products, Inc. Ambler, Pa.
General Plating Co., Trenton, N. J.
Graham, Savage & Associates, Inc., Jenkintown, Pa.
Leeds & Northrup, Philadelphia 44, Pa.
Pennsalt Mfg. Co., Philadelphia, Pa.
Philadelphia Rust Proof Co., Philadelphia 34, Pa.
Progress Mfg. Co., Inc., Philadelphia 34, Pa.
Radio Corporation of America, Camden 2, N. J.
The Reynolds Co., Philadelphia 32, Pa.
Steel Heddle Manufacturing Co., Philadelphia 32, Pa.

PITTSBURGH

Secretary: Edward B. Keller
1102 Sunday St., Pittsburgh 12, Pa.

Meeting Place: Gateway Plaza, Pittsburgh, Pa.

Day of Month: Second Wednesday
Time: Dinner 6:30 P.M.—Meeting 8:00 P.M.

Sustaining Members:

Aluminum Company of America, New Kensington, Pa.
Rockwell-Standard Corp., Standard Steel Spring Div., Coraopolis, Pa.
Weirton Steel Co., Weirton, West Va.
Westinghouse Electric Corp., East Pittsburgh, Pa.

PORTLAND

Secretary-Treasurer: George Bethell
L. H. Butcher Co., 2750 N. W. 31st
Portland, Oregon

Meeting Place: Old Country Kitchen

Day of Month: Open
Time: 6:30 P.M.

Sustaining Members:

None

PROVIDENCE-ATTLEBORO

Secretary: Edward G. Amesbury
35 Rocklawn Ave., Attleboro, Mass.

Meeting Place: Providence Engineering Society Building, 195 Angell St., Providence, R. I.

Day of Month: Third Monday
Time: 8:00 P.M.

Sustaining Members:

Gorham Manufacturing Co., Providence 7, R. I.
Walton & Lonsbury, Attleboro, Mass.

ROCHESTER

Secretary-Treasurer: Linwood P. Morrison
1240 Weiland Rd., Rochester 13, N. Y.

Meeting Place: Rochester German Club, Rochester, N. Y.

Day of Month: Third Monday
Time: 8:00 P.M.

Sustaining Members:

Eastman-Kodak Co. (2), Rochester 4, N. Y.
Stromberg-Carlson Co., Rochester, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Wollensak Optical Co., Rochester, N. Y.

ROCKFORD

Secretary-Treasurer: E. J. Budden
122 12th St., Rockford, Ill.

Meeting Place: Faust Hotel, Rockford, Ill.

Day of Month: Second Monday
Time: 7:00 P.M.

Sustaining Members:

National Lock Co., Rockford, Ill.

SAGINAW VALLEY

Secretary-Treasurer: Leo C. Mangett
G-4075 Risedorph, Flint 6, Michigan

Meeting Place: Zehnder, Frankenmuth, Michigan

Day of Month: Second Wednesday
Time: 6:45 P.M.

Sustaining Members:

None

ST. JOSEPH VALLEY

Secretary: Henry A. Meers
2001 Bergan St., South Bend, Ind.

Meeting Place: Lincoln Highway Inn, Mishawaka, Ind.

Day of Month: First Wednesday
Time: 7:00 P.M.

Sustaining Members:

Bendix Aviation Corp., Bendix Prods. Div., South Bend 20, Ind.
Rockwell-Standard Corp., Mishawaka, Ind.
Roth Plating Corporation, South Bend, Ind.
Standard Plating Works, Inc., Goshen, Ind.
The Studebaker-Packard Corp., South Bend, Ind.

ST. LOUIS

Secretary: Ward W. Kelly
7046 Deerpath Drive, St. Louis 23, Mo.

Meeting Place: York Hotel, Sixth St. & Market St. St. Louis, Missouri

Day of Month: Second Wednesday
Time: 7:00 P.M.

Sustaining Members:

American Zinc Sales Co., St. Louis, Mo.
Bussman Mfg. Co., St. Louis, Mo.
Chandeysson Electric Co., St. Louis, Mo.
Davies Supply & Mfg. Co., St. Louis 16, Mo.
Folding Carrier Corp., Oklahoma City, Okla.
C. Hager & Sons Hinge Mfg. Co., St. Louis 5, Mo.
Knapp-Monarch Co., St. Louis 16, Mo.
Laselco, Inc., St. Louis 4, Mo.
Maurer Supply Co., St. Louis, Mo.
National Rejectors, Inc., St. Louis 15, Mo.
G. S. Robins Co., St. Louis 2, Mo.
Sommers Brothers Mfg. Co., St. Louis 7, Mo.

SAN ANTONIO

Secretary-Treasurer: Katherine D. Christians
106 Pool Drive, San Antonio 10, Texas

Meeting Place: Terry Industries, Inc., 2805 S. Flores St., San Antonio, Texas

Day of Month: Third Monday
Time: 7:30
Sustaining Members:
None

SAN FRANCISCO

Secretary-Treasurer: Richard T. Coen
437 Ulloa St., San Francisco, California
Meeting Place: Pastori's Restaurant, 2550 El Camino Real, Redwood City, Calif.
Day of Month: Second Thursday
Time: 7:30 P.M.
Sustaining Members:
None

SEATTLE-PUGET SOUND

Secretary: Mrs. Helen Archibald
17814 Palatine, Seattle, Wash.
Meeting Place: College Club, 6th & Spring Sts., Seattle, Wash.
Day of Month: Third Tuesday (Flexible)
Time: Dinner 7:00 P.M.—Meeting 8:00 P.M.
Sustaining Members:
Kaiser Aluminum & Chemical Corp. Spokane, Wash.

SOUTHEASTERN

Secretary: H. R. Stogner Sr.
3019 Tilson Road, Decatur, Georgia
Meeting Place: Belmont Steak House, Downtown Luckie St., Atlanta, Ga.
Day of Month: Second Friday
Time: 7:30 P.M.
Sustaining Member:
Production Plating Company, Adel, Ga.

SOUTHERN TIER

Secretary: Bill Rossiter
5 Ellen St., Rt. 97, Binghamton, N. Y.
Meeting Place: Carlton Hotel, Binghamton, N. Y.
Day of Month: Third Tuesday
Time: 7:15 P.M.
Sustaining Members:
International Business Machine Corp., Endicott, N. Y.

SPRINGFIELD

Secretary: Henry L. Heissfeld
74 Chilson St., Springfield, Mass.
Meeting Place: Blake's Restaurant, 15 Market St., Springfield, Mass.
Day of Month: Fourth Monday
Time: Dinner 7:00 P.M.—Technical Session 8:00 P.M.
Sustaining Members:
The Chemical Corporation, Springfield, Mass.
Moore Drop Forging Co., Springfield, Mass.

SYDNEY

Secretary-Treasurer: E. A. McAloon
65 Onslow St., Rosebay, N. S. W., Australia
Meeting Place: Trust Building, Martin Place & Castlereigh St.
Day of Month: Second Thursday
Time: 7:30 P.M.
Sustaining Members:
None

SYRACUSE

Secretary: Robert A. Carpenter
138 Oakland St., Syracuse, N. Y.
Meeting Place: Turn Hall, 619 N. Salina St., Syracuse, N. Y.
Day of Month: Third Monday
Time: Dinner 6:45 P.M.—Meeting 8:00 P.M.
Sustaining Members:
Oneida, Ltd., Oneida, N. Y.

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TOLEDO

Secretary-Treasurer: Ben Gomersall
6015 Anthony Wayne Trail, Route 1, Maumee, Ohio
Meeting Place: Angelo's Spaghetti House, Stickney Ave., Toledo, Ohio
Day of Month: First Thursday
Time: Dinner 7:00 P.M.—Meeting 8:00 P.M.
Sustaining Member:
The Electric Auto-Lite Co. (2), Sharonville 8, Ohio

TORONTO

Secretary: R. H. Clark
262 Woburn Avenue, Toronto, 12, Ontario, Canada
Meeting Place: Royal York Hotel, Toronto, Ontario, Canada
Day of Month: Second Friday
Time: Dinner 6:30 P.M.—Meeting 8:30 P.M.
Sustaining Members:
Armalite Company, Ltd., Toronto, Ontario, Canada
Bomac Electrotype Co., Ltd., Toronto, Ontario, Canada
British Chrome & Chemicals (Canada) Ltd., Toronto 5, Ontario, Canada
Canada Cycle & Motor Co., Ltd., Weston, Ontario, Canada
Canadian Hanson & Van Winkle Co., Ltd., Toronto, Ontario, Canada
General Motors of Canada, Ltd., Oshawa, Ontario, Canada
Houdaille Industries of Canada, Ltd., Oshawa, Ontario, Canada
International Business Machines Co.
International Nickel Co. of Canada, Ltd., (3) Toronto, Ontario, Canada
Lea Manufacturing Co. of Canada, Ltd., Scarborough, Ontario, Canada
Metal & Thermit—United Chromium of Canada, Ltd., Rexdale, Ontario, Canada
W. W. Wells, Ltd., Scarborough, Ontario, Canada

TWIN CITY

Secretary-Treasurer: Robert L. Buckley
205 11th Ave., South, Minneapolis 15, Minn.
Meeting Place: Jax Cafe, Minneapolis, Minn.
Day of Month: First Monday
Time: 7:00 P.M.
Sustaining Members:
None

WATERBURY

Secretary-Treasurer: Albert G. Griffith
94 Ridgeview Place, Cheshire, Conn.
Meeting Place: Colonial Room, Roger Smith-Elton Hotel
Day of Month: Second Thursday
Time: Dinner 6:30 P.M.—Meeting 8:00 P.M.
Sustaining Members:
American Brass Company, Waterbury 20, Conn.
American Electro Products, Inc., Waterbury, Conn.
American Chemical & Refining Co., Waterbury, Conn.
Apothecaries-Hall Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chromium Corporation of America, New York, N. Y.
Eastern Electroplating Co., Terryville, Conn.
Harper Leader, Inc., Waterbury 20, Conn.
The International Silver Co., Meriden, Conn.
The Lea Mfg. Co., Waterbury 20, Conn.
Lux Clock Manufacturing Co., Waterbury, Conn.
MacDermid, Inc., Waterbury 20, Conn.
The Patent Button Co., Waterbury 2, Conn.
Scovill Manufacturing Co., Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.
The Summit Finishing Co., Inc., Thomaston, Conn.
Wallace Silversmiths, Inc., Waterbury, Conn.
The Waterbury Plating Co., Waterbury 86, Conn.
Whyco Chromium Co., Inc., Thomaston, Conn.

WESTERN ONTARIO

Secretary-Treasurer: Robert Dobson
Box 41, Watford, Ontario, Canada
Meeting Place: William Pitt Hotel, Chatham, Ontario, Canada
Day of Month: Third Friday
Time: 7:00 P.M.—Dinner-Meeting
Sustaining Members:
Bendix Eclipse of Canada, Ltd., Windsor, Ontario, Canada
Canadian Motor Lamp Co., Ltd., Windsor, Ontario, Canada
Ontario Steel Products Co., Ltd., Chatham, Ontario, Canada

WICHITA

Secretary: Estel E. Starr
1685 So. Elpyco, Wichita 9, Kansas
Meeting Place: Oriental Restaurant, 5405 E. Central, Wichita, Kas.
Day of Month: Fourth Wednesday
Time: 6:30 P.M.
Sustaining Members:
None

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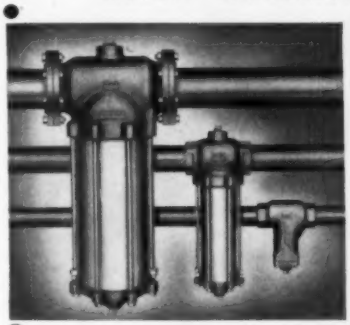

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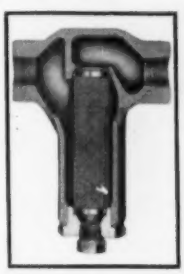

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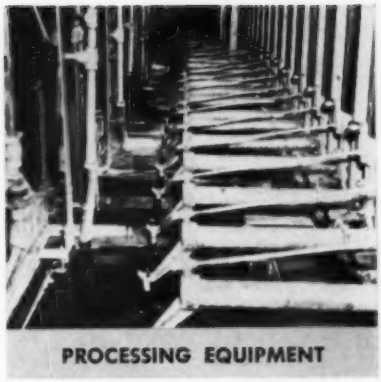
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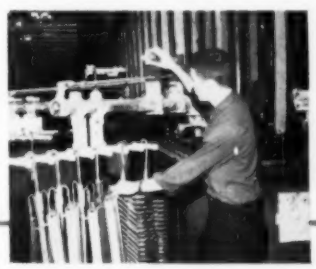

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